

SIXTY-SIXTH  
ANNUAL MEETING  
OF THE  
AMERICAN INSTITUTE OF INSTRUCTION  
ADDRESSES, DISCUSSIONS AND  
PROCEEDINGS.

BETHLEHEM, N. H., JULY 9-13, 1896.

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*Secretary*  
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# American Institute of Instruction.

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## SIXTY-SIXTH ANNUAL MEETING.

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July 9, 10, 11, 12 and 13, 1896.

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## JOURNAL OF PROCEEDINGS.

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FIRST DAY—THURSDAY, July 9.

### EVENING SESSION.

The sixty-sixth annual meeting of the American Institute of Instruction opened in the Maplewood Casino, Bethlehem, N. H., Thursday evening, July 9, 1896.

The President, Dr. Charles W. Parmenter, of Cambridge, Mass., called the Institute to order at 8.10 P. M.

Devotional exercises were conducted by Rev. Mr. Eastman, Pastor of the Congregational Church, Bethlehem.

The President then introduced the Institute Special Quartette,—Miss Harriet E. Whittier, soprano; Miss Florence King, alto; Mr. George W. Want, tenor; and Mr. Arthur B. Hitchcock, baritone;—under the direction of Prof. Geo. Mendall Taylor, pianist,—who sang “Spring Song” by Pinsuti, and in response to an encore, “Fair Luna” by Barnby.

President Parmenter extended a cordial welcome to the members of the Institute in behalf of the Directors, and introduced Hon. Fred Gowing, Superintendent of Public Instruction for the State of New Hampshire, who welcomed the Institute in the name of the State. Mr. Gowing spoke as follows :

#### WELCOME.

We knew you would come to us again. We are glad to greet you. In fact, it is incomprehensible to me that you will persist in "boarding 'round," when a permanent settlement among us would yield so much of pleasure and profit to you and so much of satisfaction and delight to us.

Even Dame Nature, our housekeeper, fickle and moody though she often is, recently negligent somewhat, too, of our comfort, has, in gleeful anticipation of this visit, furnished up the place, removed the dust, made greener the trees, and brightened every nook with many a dainty posy. And in her behalf I bid you a hearty welcome to all this exuberance of beauty, of grandeur, of strength, of life. Simple existence here will swell to pristine rotundity brain-cells fagged and flabby from the school world too much with you.

"To promote the cause of popular education" is the fundamental aim of this Institute. It is written in the constitution of this state, after the noble fashion of the fathers, that "it shall be the duty of the legislators and magistrates in all future periods of the government to cherish the interest of literature and the sciences, and all seminaries and public schools." So from the beginning this people has been in close sympathy with the purposes of this association. A constant stream of educational influence has gone from this state throughout the land. Literally this people has given of its life for the saving of the nation in war and peace. A mighty army, men and women, of clear head, sound body, and sterling character.

Educated among these hills, from whence came their

strength, in self-reliance and a love for the things that endure, has invaded every place whence the cry for help in education has gone forth. New Hampshire has given Page and Philbrick, and Swett and Parker, and Aldrich and Dutton, and a multitude whom no man can number—and the end is not yet. Quietly, without ostentation, without blare of trumpet or noisy demonstration, the line in education still advances. The people, the plain folk, have still abiding deep in their hearts a love for the common school and for all agencies that tend towards its improvement. Poor sometimes in worldly wealth they may be, but always are they rich in faith and hope and energy.

Because of the history of the past and the promise for the future, because education is dear to us as the apple of our eye, for the state of New Hampshire, I bid you welcome to our borders. So many of you and like you we call our own, that we hail you as those who are home returning.

It is our hearty wish that you enjoy this rest and respite from care, that you feel at home, that you call ours yours, that you take to yourselves the cordial welcome which I extend to you, as the representative of the state which I am honored in serving, and as a representative of the teachers of whom I am proud to be one, as a token of our fondest esteem and kindly feeling for the American Institute of Instruction.

President Parmenter responded briefly on behalf of the Institute.

The address of the evening was delivered by James MacAlister, LL. D., President of Drexel Institute, Philadelphia, on "The Real and the Ideal in Education."

(For all addresses and the lengthier speeches in debate, the reader is referred to pages of this volume following the Journal of Proceedings and its appendices. The two parts of the volume are distinguished by difference in style of paging.)

Certain notices were given by the President, and Misses Whittier and King sang "Absence" and "Spring," both by Lassen.

The Institute adjourned at 9.45.

## SECOND DAY—FRIDAY, July 10.

### MORNING SESSION.

The meeting of the Institute was called to order in Crust Hall by President Parmenter, at 9.20 a. m., and devotional exercises were conducted by Rev. Mr. Keeler, Pastor of the Methodist Episcopal Church, Bethlehem.

The Institute Quartette sang the "Hunting Song" by Benedict, and as an encore "Oh, Hush Thee" by Sullivan.

The first paper of the morning was read by Henry W. Hartwell, Architect, of Boston, "Upon School Architecture."

This was followed by a paper upon the "Ventilation of School Buildings," by S. Homer Woodbridge, Professor of Heating and Ventilation, Massachusetts Institute of Technology.

A paper upon "The Hygiene of Instruction" was presented by Edward M. Hartwell, Ph.D., M.D., Director of Physical Training in the Boston Public Schools.

The last paper of the session was upon the "Interior Decoration of School Buildings," and was read by Walter Gilman Page, Artist, of Boston.

Superintendent Orsamus B. Bruce, of Lynn, Mass., was called upon by the President to open a discussion upon the general subject covered by the papers of the morning, but pleasantly excused himself on account of the lateness of the hour, and the Institute adjourned at 1.15 P. M.

EVENING SESSION.

The Institute was called to order by the President at 8.10 P. M., in the Maplewood Casino.

The Quartette sang "The Miller's Wooing" by Fanning, and responded to an encore with "My little Barque" by Ford.

President T. C. Mendenhall, Ph.D., LL. D., President of the Worcester Polytechnic Institute, gave a very interesting and instructive address on "A Reform in Weights and Measures."

At this point the President announced the appointment of the following committees;

*On Nominations:*

Hon. Thomas B. Stockwell, Rhode Island.  
E. D. Russell, Massachusetts.  
Hon. Fred Gowin, New Hampshire.  
Edward Conant, Vermont.  
Hon. W. W. Stetson, Maine.

*On Resolutions:*

George A. Walton, Massachusetts.  
Nathan G. Kingsley, Rhode Island.  
Edwin H. Whitehill, Vermont.  
D. N. Camp, Connecticut.  
Daniel W. Jones, Massachusetts.

"The Claims of Modern Life on Education" was the subject of the next paper, which was read by Wm. T. Sedgwick, Ph.D., Professor of Biology in the Massachusetts Institute of Technology.

Mr. Want of the Quartette sang a "Patriotic Song," arranged from Shelley, and as an encore "Love's Sorrow," also by Shelley.

The Institute adjourned at 9.50 P. M.

### THIRD DAY—SATURDAY, July 11.

#### MORNING SESSION.

The Institute was called to order in Crust Hall by the President at 9.25 A. M., and the devotional exercises were conducted by Rev. Henry Blanchard, D. D., of Portland, Me. As a response to the prayer the Quartette sang "Heart be Still" by Warren. They also rendered "The Triton's Song," arranged from Molloy, and as an encore "Sweet and Low" by Barnby.

Superintendent George I. Aldrich, of Newton, Mass., then read a paper upon "Some New Educational Problems," and was followed in a discussion of the same subject by Thomas M. Balliet, Ph. D., Superintendent of Schools, Springfield, Mass.

The general subject of "The Rural School Problem" was then taken up and the opening paper upon "Close Supervision," prepared by Hon. Mason S. Stone, Superintendent of Education for the State of Vermont, was read in his absence by Edwin H. Whitehill, of Woodstock, Vt. The "Training of Teachers" was discussed

by Hon. W. W. Stetson, Superintendent of Schools for the State of Maine.

A very animated and interesting discussion followed, in which the leading parts were taken by Hon. Thomas B. Stockwell, Commissioner of Public Schools for the State of Rhode Island, C. C. Rounds, Ph. D., Principal of Normal School, Plymouth, N. H., and Hon. Fred Gowing, Superintendent of Public Instruction in New Hampshire.

Further contributions were made by Rev. A. E. Winship, Editor of the *Journal of Education*; Will S. Monroe, who explained the California method of dealing with rural schools; Secretary Frank A. Hill, who thought that the state should render more assistance; Superintendent Thomas M. Balliet, who expressed the opinion that state aid should be accompanied with state control; Dr. James MacAlister, who testified to his interest in the discussion; and George A. Walton, who has attended the meetings of the Institute for fifty years and who recited some of his experiences with rural schools. Mr. Winship, at the close of the discussion, aroused much enthusiasm in behalf of the services of Mr. Walton, by paying to his labors a most earnest tribute and relating some occurrences of which he had personal knowledge.

After a very fruitful and interesting session the Institute adjourned at 12.55 P. M.

#### EVENING SESSION.

The Institute was called to order by the President at 8.10 P. M., in the Maplewood Casino. The Quartette

sang "Jacky Horner" by Caldecott, and for an encore "How Sweet the Moonlight" by Leslie.

The subject discussed was "The College and the Non-Classical High Schools," and the leading paper was read by John Tetlow, D. Sc., Head Master of the Girls High and Latin Schools, Boston. The subject was further treated in a paper written by Rev. Elmer H. Capen, D. D., President of Tufts College, which was read, in his absence, by President Parmenter.

Miss King sang "Angus Macdonald," and, on being recalled, also sang "Joy" by Hadley.

The Institute adjourned at 9.35 P. M.

#### FOURTH DAY—SUNDAY, July 12.

At 7.30 P. M., a largely attended vesper service was held in the Maplewood Casino, which was rendered notable and inspiring by the eloquent address of the presiding clergyman, and by the fine music of the Quartette. The programme was as follows:

Invocation.

Scripture Reading.

Prayer.

Response. "Cast thy Burden upon the Lord."

#### PART I. Oratorio Elijah.

*Tenor Recitative.* "Ye people rend your hearts."

*Tenor Aria.* "If with all your hearts."

*Alto Recitative.* "Now Cherith's brook is dried up."

*Soprano and Bass.* "What have I to do with thee."

*Alto Aria.* "Woe unto them."

*Tenor Recitative.* "O man of God."

*Bass and Quartet.* "O Lord thou hast overthrown."

ADDRESS, by Professor William R. Shipman, D. D., of Tufts College.

PART 2. *Oratorio Elijah.*

<i>Soprano Aria.</i>	“Hear ye, Israel.”
<i>Tenor Recitative.</i>	“Man of God.”
<i>Bass Aria.</i>	“It is enough.”
<i>Quartet.</i>	“He watching over Israel.”
<i>Alto Aria.</i>	“O rest in the Lord.”
<i>Quartet.</i>	“O come every one that thirsteth.”

PRAYER AND BLESSING.

FIFTH DAY—MONDAY, July 13.

MORNING SESSION.

The Institute was called to order by the President at 9.10 A. M., and Rev. Henry Blanchard, D. D., of Portland, Me., conducted the devotional exercises. The Quartette sang “Phoebus” by Barnby, and in response to an encore, “Old King Cole,” arranged from Archer.

The report of the committee on Necrology was read by D. N. Camp, of New Britain, Conn., as follows:

REPORT OF THE COMMITTEE ON NECROLOGY.

In preparing this report, the committee have endeavored to follow well established precedents, by including only the names of those persons who have been identified with this Institute as active members. If any names have been omitted, which should have been included, it was from oversight, or lack of requisite information.

The report includes several of the earlier active members of the Institute, who sustained it in its infancy, who co-operated with others in its growth and development, and who had seen its early prophecies fulfilled in the great progress made in every department of education. It would

be impossible to measure the amount and extent of their influence.

REV. EDWARD BEECHER, D. D.

Edward Beecher, son of Rev. Dr. Lyman Beecher, was born at East Hampton, Long Island, August 27, 1803. He graduated at Yale College in 1822, and for the next two years taught in the high school in Hartford, Conn., and then became a student in Andover Theological Seminary. In less than a year, he was called to Yale College as tutor, but left two years after, to accept a call to the pastorate of the Park Church, Boston. He was ordained and installed, December 27, 1826, but was dismissed October 20, 1830, and was then president of Illinois College at Jacksonville, for thirteen years.

From March, 1844 to November, 1855, he was pastor of the Salem Street church, Boston, and for four of these years, senior editor of the Congregationalist. He was pastor of the First Congregational church at Galesburg, Illinois, from 1855 to 1871, and the next year removed to Brooklyn, N. Y., where he was for a short time in charge of a small church in the suburbs of the city, occasionally writing for the press. His principal published works were the "Conflict of Ages," and the "Concord of Ages," both of which provoked considerable discussion.

He was deeply interested in education not only when teaching, but when a pastor and editor. He became a member of the American Institute of Instruction in 1854, and delivered a lecture before it at its twenty-fifth annual meeting, when he was introduced as "Edward Beecher, the teacher and preacher." He received the degree of D. D. from Marietta College in 1841.

He married Isabella P. Jones, of Wisconset, Maine, October 27, 1829. He died in Brooklyn, July 28, 1895, aged nearly ninety-two years. His wife and two sons survived him, but his wife died in November last.

CHARLES NORTHEND.

Charles Northend was born in Newburyport, Mass., April 2, 1814. He prepared for college at Dummer Academy, By-

field, Mass., and at the age of sixteen entered Amherst College, where he remained two years, and from which, some years after, he received the degree of A. M. Soon after leaving college he engaged in teaching, first as assistant in Dummer Academy, and subsequently in charge of schools at Danvers and Salem, in his native state.

After twenty years experience in teaching, he was appointed superintendent of schools at Danvers, where he remained three years. On the appointment of John D. Philbrick as superintendent of common schools in Connecticut, in 1855, Mr. Northend became secretary in the superintendent's office, and removed to New Britain, in that state. He continued in this office during the terms of service of Mr. Philbrick and Mr. Camp, or about eleven years.

On retiring from this position, he was engaged in the life insurance business, but still retained his interest in education, and was often employed in holding teachers' institutes or lecturing. In this work he visited all the New England states and New York and Pennsylvania. He was for twenty years member of the town school committee of New Britain, and for eight years superintendent of the town schools.

He was for a time president of the Essex County Teachers' Association of Massachusetts, and contributed to the success of its meetings. He was chairman of the committee which called the convention for organizing the Massachusetts Teachers' Association, in 1845, and also of the committee to draft the constitution, and was for several years corresponding secretary of the association. He was a member of the American Institute of Instruction for fifty years, its president in 1863, and lectured before it at three of its annual meetings.

In 1884 he prepared a history of its meetings for fifty-four years, which was published under the title of the "Annals of the American Institute of Instruction." He was also author of the "Teacher and Parent," "Teacher's Assistant," "Life of Elihu Burritt," "Choice Gems," "Memory Gems," and was editor of the Connecticut Common School Journal for several years.

He was a member of the city common council of New

Britain one term. He was for many years deacon of the First Church of Christ, New Britain, and superintendent of its Sunday school. He was married Aug. 18, 1834, to Lucy Ann Moody, who died several years ago. He died Aug. 7, 1895, at the age of 81. Two sons survive him.

For more than half a century Mr. Northend was connected with the cause of education, and by his kindness and friendly counsel proved himself the friend of children and the wise counselor of parents and teachers.

#### WILLIAM H. LADD.

William H. Ladd, born in December, 1824, began teaching in Lynnfield, Mass., when but seventeen years of age, and, with the exception of two years passed at the Bridgewater normal school, he engaged in his profession continuously until a short time before his death, September 6, 1895. After leaving the normal school, he taught in Baltimore two years, and was then appointed sub-master of the Harvard Grammar School in Charlestown. From 1850 to 1855, he was principal of the Shepard Grammar School, Cambridge, where his ability and devotion, soon won him a high place in the esteem of the community.

In 1855, he went to the Chauncy Hall School, Boston, first as instructor, but in 1860, he became co-proprietor with Mr. Cushing, and in 1879, sole principal. By his broad views, rare skill and untiring energy and devotion, he brought this school to a high standard of excellence and his memory will be long cherished by pupils and friends.

He became a member of this institute in 1875.

#### SAMUEL HARRINGTON.

Samuel Harrington was born in Paxton, Mass., in 1839. He entered Amherst College, but on the breaking out of the civil war went into the army, where he was promoted from one post to another, until he received a commission as lieutenant-colonel. On returning from the war, he resumed his studies at Amherst College and in due time graduated with honor. Soon after he engaged in teaching, first in

New Bedford, then in Gloucester, and later still in the Melrose high school. He was for a time instructor in the English high school of Boston, and in 1876 became principal of the Elliott grammar school, and held this position until his death. He was much respected in college and in the army, and also in his professional life as a teacher. He had been post commander of Edward W. Kingsley post, 112, of G. A. R., and belonged to the Legion of Honor. He was in his school the early part of September, but was soon taken ill and died at his home in Boston, October 4, 1895. He first became a member of this institute at the Worcester meeting in 1870, and was afterwards in attendance upon its meetings.

**NORMAN A. CALKINS, LL.D.**

Norman A. Calkins was born in Gainesville, N. Y., September 9, 1822. At the age of eighteen he began teaching and continued in this work in his native town and in Castile, until 1845, when he was appointed superintendent of the schools in Gainesville. After service of two years in this office, he devoted most of his time for several years to holding teachers' institutes in New York and elsewhere, and lecturing on Education. In November, 1862, he was appointed assistant superintendent of the schools, in the city of New York. His special work was in the primary departments, which soon felt the influence of his conscientious and pains-taking efforts for their improvement.

In the more than thirty years of service in this position he did much to improve the methods and elevate the standard in these schools. He received the degree of LL.D., from Marietta college in 1863.

He was a life member of the National Educational Association, its treasurer in 1883-85, its president in 1886, and the chairman of its board of trustees at the time of his death. He had for twenty-six years been the treasurer by annual appointment of the Congregational Church Building Society, and for a considerable portion of this time, trustee and chairman of the finance committee.

He was widely known as a lecturer on educational sub-

jects, and as an author of educational works among which were "Manual of Object Training," "Primary Object Lessons," "Ear and Voice Training," "Aids in Object Teaching," and "Trades and Occupations."

He became an active member of the American Institute of Instruction in 1863, and for several years was one of its board of officers, regularly attending the annual meetings and participating in the discussions. He lectured before the institute in 1871. He died at his home in New York City, December 22, 1895.

#### JOHN NEWTON BARTLETT.

John Newton Bartlett, son of Rev. John Bartlett, was born in Windsor, Conn., July 3, 1823. He prepared for college at Ellington Academy, but was obliged to give up a college course and began teaching school at Farmington, Conn. From there he went to New Haven, where he taught a private school. He was principal of the high school in Collinsville for a few years, and in 1858 went to New Britain where he became principal of the high school. He remained at the head of this school until 1864, when he was appointed associate principal of the State normal school, remaining in the position a short time. He became superintendent of the schools in New Britain in 1883, and held the position until his death. He was for a short time secretary and treasurer of the Wire Web Company, and assistant postmaster. He had been deacon of the South Congregational Church, New Britain, twenty years.

He was married September 7, 1846, to Miss Ellen Strong, who died a few years ago. He died December 24, 1895, after an illness of a few hours.

He had been a member of the American Institute of Instruction for many years, and delivered a lecture before it in 1864. He left one son, John P. Bartlett, Esq., of Mitchell, Hungerford and Bartlett, and two daughters, both teachers.

#### BENJAMIN FRANKLIN TWEED.

Benjamin Franklin Tweed was born in Reading, South Parish, Mass., Jan. 17, 1811. He attended the public schools

and South Reading Academy, and began teaching early. At first he taught winters only, in Lynnfield, Hyannis and Cottuit; subsequently he taught through the year in Medford, Cambridge and Charlestown. From 1855 to 1864 he was professor of logic, rhetoric and English literature in Tufts College, and from 1864 to 1870 professor of English literature in Washington University, St. Louis, Mo.

In 1870 to 1875 he was superintendent of public schools in Charlestown district, Boston, and from 1876 to 1880 supervisor of schools in Boston, and afterwards for several years an influential member of the school committee of Cambridge. He was one of the proprietors of Tower & Tweed's private school, Boston, and president of the Teachers' Friday Evening School.

He was one of the oldest educators in New England, having been actively engaged in some position connected with educational work more than fifty years; and the number of persons who came under his influence was large. He was also one of the oldest members of the American Institute of Instruction, having become a member in 1831, the year after the association was organized. At the annual meeting in 1855 he delivered the opening lecture on "The Claims of Teaching to rank as a Distinct Profession." He died April 1, 1896, at the age of eighty-five.

#### CHARLES P. RUGG.

Charles P. Rugg was born in Hinsdale, New Hampshire, August 12, 1827. He prepared for college at Townshend Academy, Vermont, and entered Amherst College, where he graduated in 1854, receiving the Phi Beta Kappa standing for high scholarship. He immediately entered upon the profession of teaching, first for three years in Rochester Academy, and next for four years as principal of the high school at Fair Haven, in the same state.

In 1861 he became principal of the New Bedford high school, and held the position continuously for twenty-five years. In all these positions his faithfulness as an instructor, and his excellent qualities of mind and heart, won for

him the respect and esteem of all who knew him. He was a member and officer of the Massachusetts Teachers' Association, and also of the American Institute of Instruction.

He was representative in the Legislature of Massachusetts in 1887, 1889, 1893 and 1894. He was treasurer of the Trinitarian Church, New Bedford, and one of the trustees from 1889 until last February. He had been president of the Lyceum and trustee of the Institution for Savings of New Bedford. He was married August 10, 1857, to Mary Philips Ruggles, daughter of James Ruggles, Esq., of Rochester, who, with a son and daughter, survives him.

He died June 9, 1896, leaving a large circle of friends to mourn their loss. He had a wide influence, which was exerted for the good of society, and which will be long felt in the city of his home.

DAVID N. CAMP, { Committee on  
J. S. BARRELL, } Necrology.

The report of the committee was unanimously accepted and adopted by a rising vote, and the audience remained standing while the Quartette sang "The Homeland" by Sullivan.

"A Study of American Normal Schools" was the subject of a paper presented by Fred W. Atkinson, Ph. D., Principal of the High School, Springfield, Mass., and the same general topic was further treated by Charles C. Ramsay, Principal of B. M. C. Durfee High School, Fall River, Mass.

The next paper, upon "Nature-Study and Science" was by T. W. Harris, Ph. D., Superintendent of Schools, Keene, N. H. The paper upon this subject prepared by A. L. Lane, Instructor in the Coburn Classical Institute, Waterville, Me., was not read on account of his absence.

After a brief intermission, Walter Ballou Jacobs, Associate Professor of Pedagogy in Brown University, read a paper upon "The Training of Teachers for Secondary Schools." The subject was further treated by Samuel T. Dutton, Superintendent of Schools, Brookline, Mass.

The Committee on Membership submitted a preliminary report, which was received and adopted.

George A. Walton, Chairman on the Committee of Resolutions, submitted the following report :

*Resolved*, That the thanks of the Institute be extended to the several railroads and hotels that have given to its members reduced rates of travel and entertainment; to the press for public notices of its meetings; to the several speakers and essayists for their stimulating and instructive addresses; and to the Institute Quartette for its contribution to our entertainment.

*Resolved*, That the thanks of the Institute be extended to Mr. George D. Cruff for the use of Cruff Hall, and for other hospitalities offered to the Association during the present sessions.

*Resolved*, That the thanks of the Institute be extended to Dr. Charles W. Parmenter for his courteous and devoted service in administering the affairs of the Institute for the past year; also, that we record our sincere regrets that he declines to accept the office of executive for the coming year.

*Resolved*, That the claims of modern life upon education call for the broadest culture in mind and heart of teachers, the highest wisdom in school supervisors, and the most thoughtful consideration in the whole people; that to meet these claims courses of study, forms of instruction and methods of teaching should be ordered with reference to economy in time and effectiveness in results; and hence, as direct practical means to this end,

*Resolved*, (1) That Congress should enact a law making mandatory the use of an improved system of weights and measures;

*Resolved*, (2) That the several State Governments should make liberal appropriations of money to be applied especially to rural communities in order that the burdens of taxation for the support of schools shall be more nearly equalized, and that there may be secured for all schools the essential requisites of skilled supervision and thoroughly trained and efficient teachers.

*Whereas*, Dr. Daniel B. Hagar, of Salem, one of the most respected and best beloved of our members, has during the past year been greatly afflicted by the death of his beloved wife, and because of ill health has felt called upon to resign the principalship of the Salem Normal School, to which he had given the best years of a long and useful life,—therefore

*Resolved*, That the American Institute of Instruction extends to him its sympathy, assuring him of its continued affection. We wish for him the greatest comfort and joy in the retirement he has so well earned.

The report of the Committee was accepted and the resolutions as read were adopted.

The following preamble and resolution were offered by Rev. Albert E. Winship :—

*Whereas*, it is twenty-five years since George A. Walton was appointed Agent of the Massachusetts State Board of Education, and fifty years since he joined the American Institute of Instruction, of which he has since been an active member, its treasurer for many years, and one of its eminent presidents,—therefore

*Resolved*, That we honor these anniversaries by placing on record our high appreciation of his noble professional spirit, life-long devotion to the cause of education, his honorable career as a teacher and as a distinguished state official and his eminent service as the author of most creditable and useful text-books.

Very cordial and complimentary remarks in regard to the character and work of Mr. Walton were made by

Supt. O. B. Bruce, of Lynn, Mass., and the resolutions were unanimously adopted.

Mr. Walton returned thanks to the Institute for the expression of their confidence and respect.

President Parmenter also expressed his gratitude for the appreciation shown his efforts in the resolutions reported by the committee and adopted by the Institute.

Hon. Thomas B. Stockwell, in behalf of the Committee on Nominations, submitted a list of officers for the ensuing year. The report was accepted, and by unanimous consent, Mr. Stockwell was authorized to cast a ballot bearing the names as reported.

The gentlemen included in the list were thereupon declared elected.

(For a list of the officers as elected see subsequent pages of this volume.)

The Institute adjourned at one o'clock p. m.

#### EVENING SESSION.

The Institute was called to order in the Maplewood Casino at 8.15 p. m. by President Parmenter.

The Quartette sang "The Sea hath its Pearls" by Pinsuti, and in response to an encore, "Night, lovely Night," by Berger.

A paper was then read upon "The Manual Training High School in its relation to Preparation to College" by Ira N. Hollis, Professor of Engineering in the Lawrence Scientific School of Harvard University.

The next paper was entitled "The Aesthetic Element in Education" and was read by Frank A. Hill, Lit. D., Secretary of the Board of Education of Massachusetts.

The same subject was briefly discussed by Rev. A. E. Winship, Editor of the *Journal of Education*, and a few words were added by J. S. Barrell, of Cambridge, Mass.

Supt. A. F. Pease, of Northampton, Mass., submitted a further report in behalf of the Committee on Membership, and the same was accepted and adopted.

Hon. Thomas B. Stockwell moved the adoption of the following preamble and resolution;

*Whereas*, Mr. James W. Webster, who has served the Institute as assistant secretary in 1873-74, as secretary in 1875-76, and as treasurer since 1882, has declined a re-election; therefore

*Resolved*, That we desire to record our high appreciation of the devotion to the interests of the Institution, the faithfulness in the discharge of arduous and delicate duties, and the unfailing courtesy that have characterized this long period of service.

The motion of Mr. Stockwell was seconded by Secretary Hill and prevailed by unanimous vote.

Mr. Hitchcock, of the Quartette, sang "Gipsy John" by Clay, and on being recalled, "Vagabond" by Molloy.

President Parmenter then paid a hearty tribute to the faithful and efficient services of the retiring treasurer and secretary, expressing his hearty thanks for their efficient co-operation in making the meeting of the Institute interesting and successful, and at the conclusion of his remarks presented the gavel to his successor, wishing him a successful administration.

In assuming the duties of his office, Mr. Winship pledged his best efforts in behalf of the continued influence and usefulness of the organization.

Both the retiring and the incoming Presidents were greeted with hearty applause.

The Institute adjourned at 10.07 P. M., subsequent to which a meeting of the Board of Directors was held for the transaction of routine business.

OFFICERS  
OF THE  
AMERICAN INSTITUTE OF INSTRUCTION.

1896-'97.

*President*—Albert E. Winship,  
3 Somerset St., Boston, Mass.  
*Secretary*—Walter P. Beckwith,  
285 Lafayette St., Salem, Mass.  
*Treasurer*—Alvin F. Pease,  
77 Round Hill, Northampton, Mass.  
*Assistant Secretary*—Edwin H. Whitehill,  
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*Assistant Treasurer*—Leverett L. Camp,  
1308 Chapel St., New Haven, Conn.

*Vice-Presidents.*

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Adelaide V. Finch, Lewiston.  
S. J. Graves, Augusta.  
William E. Sargent, Bangor.  
Mary S. Snow, Bangor.

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William H. Cummings, Meriden.  
Channing Folsom, Dover.

T. W. Harris, Keene.  
Lemuel S. Hastings, Nashua.  
C. C. Rounds, Plymouth.  
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A. L. Hardy, St. Johnsbury.

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A. G. Boyden, Bridgewater.  
William F. Bradbury, Cambridge.  
O. B. Bruce, Lynn.  
Clarence F. Carroll, Worcester.  
Francis Cogswell, Cambridge.  
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Arthur L. Doe, Somerville.  
S. T. Dutton, Brookline.  
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Gertrude Edmand, Lowell.  
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Henry Whittemore, Waltham.

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Frank D. Blakeslee, East Greenwich.  
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E. Harrison Howard, Providence.  
David W. Hoyt, Providence.  
Walter B. Jacobs, Providence.  
Nathan G. Kingsley, Providence.  
Lewis H. Meader, Providence.  
Joseph E. Mowry, Providence.  
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William T. Peck, Providence.  
Frank A. Spratt, Olneyville.  
Horace S. Tarbell, Providence.  
William E. Wilson, Providence.

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George A. Cadwell, Taftville.  
David N. Camp, New Britain.  
Charles W. Deane, Bridgeport.  
Andrew F. Gates, Hartford.  
George P. Phenix, Willimantic.  
G. A. Stuart, New Britain.

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Fred Gowing, Concord, N. H.  
Frank A. Hill, Cambridge, Mass.  
Charles D. Hine, Hartford, Conn.  
Ray Greene Huling, Cambridge, Mass.  
James MacAlister, Philadelphia, Penn.  
George H. Martin, Lynn, Mass.  
Charles W. Parmenter, Cambridgeport, Mass.  
W. W. Stetson, Auburn, Me.  
Thomas B. Stockwell, Providence, R. I.  
Mason S. Stone, Montpelier, Vt.  
George A. Walton, West Newton, Mass.

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OF THE  
American Institute of Instruction.

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Conley, George H., Boston, Mass.

Corthell, W. J., Gorham, Me.

Cowell, Hervey S., Ashburnham, Mass.

Cragin, William N., Laconia, N. H.

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Dewey, Mrs. Julia M., North Adams, Mass.

Doe, Arthur L., Somerville, Mass.

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Dunton, Larkin, Boston, Mass.

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Edmand, Gertrude, Lowell, Mass.

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dence, R. I.

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Me.

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boro, Mass.

Holland, Sara J., Middle-  
boro, Mass.

Horne, Irving W., Braintree,  
Mass.

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dence, R. I.

Hoyt, David W., Provi-  
dence, R. I.

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bridge, Mass.

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chester, N. H.

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field, Mass.

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Ilsley, Reuben L., Belfast,  
Me.

Irving, A. P., Skowhegan,  
Me.

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Jackson, Joseph, Worces-  
ter, Mass.

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dence, R. I.

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gartown, Mass.

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Mass.

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hill, Mass.

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Mass.

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R. I.

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Easton, Mass.

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Roslindale, Mass.

Leadbetter, Maud E., Ros-  
lindale, Mass.

Learned, Alonzo K., Holden,  
Mass.

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Mass.

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ton, Mass.

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Northampton, Mass.

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H.

Lord, Vera C., Saco, Me.

Lull, H. W., Quincy, Mass.

MacAlister, James, Phila-  
delphia, Penn.

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idence, R. I.

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Mass.

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Keene, N. H.

McKenney, L. T., Bedford,  
Mass.

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idence, R. I.

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Mass.

Moore, C. S., New Bedford,  
Mass.

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ford, Mass.

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Mass.

Mowry, Joseph E., Prov-  
idence, R. I.

Mowry, William A., Hyde  
Park, Mass.

Nolen, A. Eugene, Fitch-  
burg, Mass.

Norris, John O., Boston,  
Mass.

Northend, Charles, New  
Britain, Conn.

Northrup, B. G., Clinton,  
Conn.

Nye, John M., Phenix, R. I

Owen, Lincoln, Boston,  
Mass.

Page, James A., Boston,  
Mass.

Paine, Mabel A., Chicopee,  
Mass.

Parker, Edward, Brockton,  
Mass.

Parlin, Frank E., Natick,  
Mass.

Parmenter, Charles W., Cambridgeport, Mass.

Pease, Abbie D., Edgartown,  
Mass.

Pease, Alvin F., Northampton,  
Mass.

Peck, John H., New Britain,  
Conn.

Peck, William T., Providence, R. I.

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Pillsbury, Rev. John H., Stoneham, Mass.

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Ramsay, Charles C., Fall River, Mass.

Rich, Ruth G., Dorchester, Mass.

Rochefort, Etta C., Leeds, Northampton, Mass.

Rogers, M. Thatcher, Boston, Mass.

Roote, Clarence B., Northampton, Mass.

Rounds, C. C., Plymouth, N. H.

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Smith, Hamilton I., Boston, Mass.

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Snow, Mary S., Bangor, Me.

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Springer, R. F., Bowdoinham, Me.

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Stockwell, Hon. Thomas B., Providence, R. I.

Stoddard, George H., Scarborough, Me.

Stone, Admiral P., Springfield, Mass.

Stone, Hon. Mason S., Montpelier, Vt.

Stratton, J. D., Springfield, Mass. [Conn.]

Stuart, G. A., New Britain.

Stuart, Henrietta T., Cornish, Me.

Sturtivant, Margaret S., Portland, Me.

Tancred, Peter, Boston,  
Mass.

Tarbell, Horace S., Providence, R. I.

Tetlow, John, Boston, Mass.

Thayer, Edwin S., Fall River, Mass.

Thayer, Rev. William M., Franklin, Mass.

Thomas, Anna D., Germantown, Philadelphia, Penn.

Thomas, Harriet, Germantown, Philadelphia, Penn.

Thompson, John G., Fitchburg, Mass.

Thompson, Thomas E., Leominster, Mass.

Tilley, Charles C., Providence, R. I.

Todd, Mary A., Lynn, Mass.

Tuttle, J. A., Freeport, Me.

Walker, Isaac, Pembroke, N. H.

Wallace, Charles L., Lisbon, N. H.

Walton, George A., West Newton, Mass.

Webber, Adelia J., Leeds, Me.

Webster, Rev. Eugene C., Dorchester, Mass.

Webster, James W., Malden, Mass.

Wetmore, S. A., Dorchester, Mass.

Wheeler, Imogene H., Jersey City, N. J.

Whitehill, Edwin H., Woodstock, Vt.

Whittemore, Henry, Waltham, Mass.

Wilkins, H. Adeline, Wrentham, Mass.

Williams, Schulyer P., Bridgeport, Conn.

Wilson, William E., Providence, R. I.

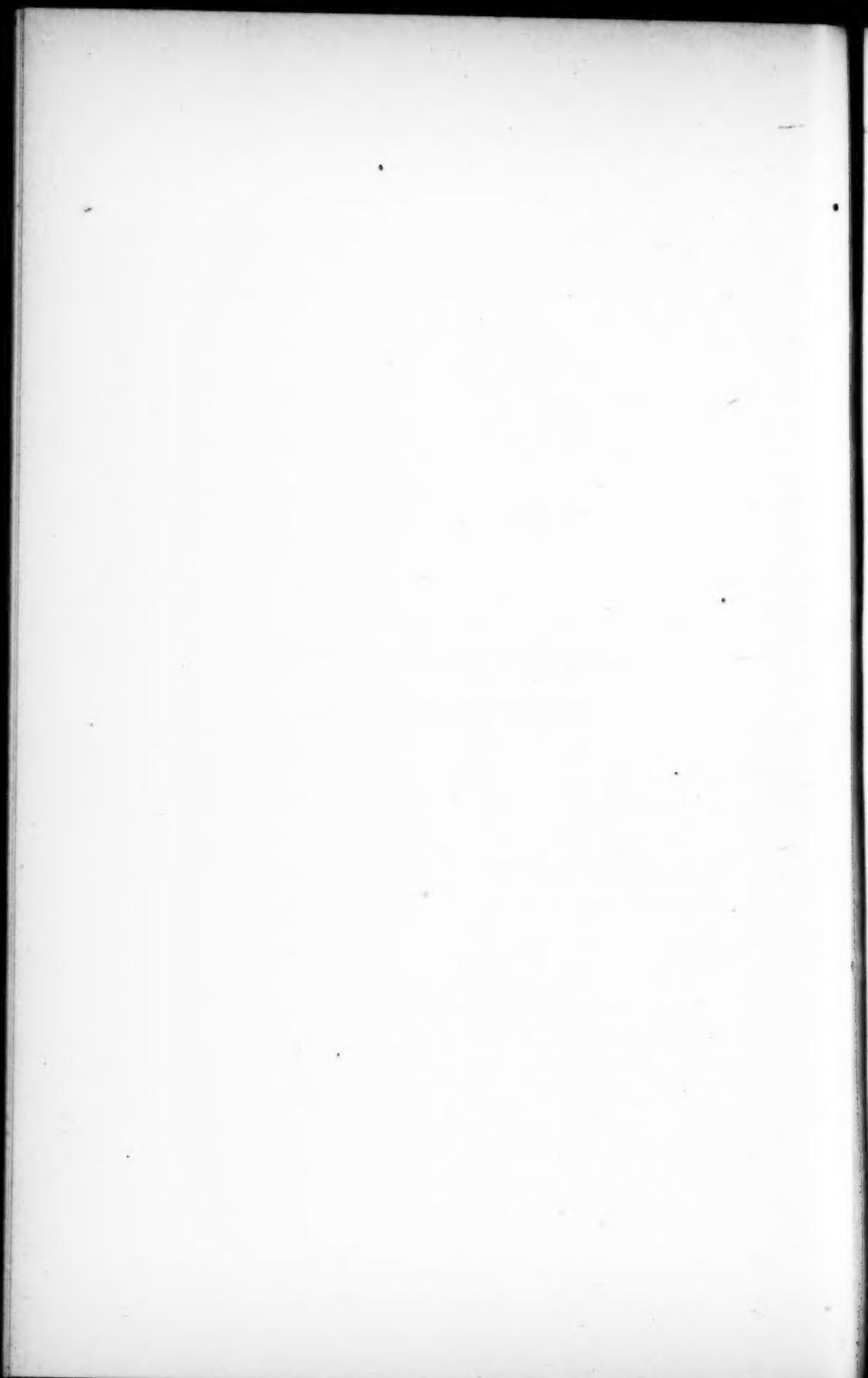
Winship, Albert E., Somerville, Mass.

Worcester, John C., West Springfield, Mass.

Young, Walter H., Warren, R. I.



ADDRESSES AND  
DISCUSSIONS.



## I.

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### **THE COLLEGES AND THE NON-CLASSICAL HIGH SCHOOLS.**

**BY JOHN TETLOW, D. SC., HEAD MASTER OF THE GIRLS'  
HIGH AND LATIN SCHOOLS, BOSTON.**

In view of the spirit of hearty and effective co-operation which now prevails between the colleges and the secondary schools, not only of New England, but of the country at large, it may perhaps surprise some of the younger members of the teaching profession to learn that this spirit is something of quite recent growth. It has, indeed, been developed within the last 12 years, and its history and progress can be distinctly traced. It had its birth in Boston.

At the session of the Massachusetts Classical and High School Teachers' Association which was held in Boston, April 12, 1884, the following resolutions, offered by Mr. William C. Collar, were unanimously adopted :

*Resolved* :—That, in the opinion of this Association, the want of understanding and effective co-operation between the teachers of preparatory schools and the faculties of colleges, is a serious evil.

*Resolved* :—That a meeting of delegates from this Association with representatives of the New England colleges would be productive of good.

By vote of the association, the secretary was instructed to send a copy of these resolutions to the president of each of the nineteen New England colleges ; but when, at the April meeting of the following year, 1885, he made his report, he was obliged to say that only three of the presidents communicated with—those of Harvard, Colby, and Boston universities—had acknowledged his communication.

I do not remember that the result of this effort created any marked surprise. Indeed, this incident was only one among many manifestations of the attitude of reserve and isolation then maintained by the members of college faculties towards the teachers of secondary schools. At that time, the universal method of bringing the secondary schools into closer relations with the colleges was for the colleges to express their ideals of precollegiate training by framing and publishing in their catalogues requisites for admission. These requisites for admission, being afterwards made the subject of compulsory entrance examinations, were dutifully accepted by teachers and other authorities of secondary schools, with perhaps an occasional futile protest on the part of insubordinate individuals, as the basis of their courses of study. College officers as a rule—though there were notable exceptions—did not attend the meetings of associations of teachers of secondary schools, and were generally credited with a disposition to view themselves as a sort of Brahmin caste in the educational system. I have said that there were

notable exceptions to this prevailing rule. President Eliot, for example, from the moment of his becoming the head of Harvard University, recognized it as his official duty to concern himself with all important questions affecting secondary education ; and, in the broad and enlightened spirit which has characterized his administration of that institution, he has, from that time until the present, given liberally of his time and thought to the solution of such questions. Other noteworthy examples were President Capen and Professor Fay of Tufts College ; but these exceptions only proved the rule. The resolutions I have quoted and the reception accorded them were significant symptoms of a wide-spread and deep-seated disease in the body educational.

But to return to the resolutions. No sooner had the report of the secretary been received than a motion was made and carried that a committee of three persons, known to be deeply impressed with the need of co-operation between the colleges and the secondary schools, and willing to take the time and put forth the effort necessary to bring about such co-operation, should be appointed with full power to devise and carry into effect such measures as should seem to them most likely to be efficacious.

Such a committee was appointed, and the members went at once quietly and industriously to work. Dividing the labor among themselves, they individually opened correspondence with the presidents of the New England Colleges ; received and accepted from several of them invitations to personal conferences on the subject matter of the correspondence ; prepared a programme, on which leading college officers and heads of secondary

schools had a place ; fixed a date and issued invitations for a general conference of prominent representatives of the colleges and secondary schools of New England ; even draughted a tentative constitution for a new association, that no appliance might be wanting for giving permanence to such tendencies towards co-operation as might appear ; and finally, on October 17, 1885, six months from the date of their appointment, the Committee had the satisfaction of witnessing, as the result of their labors, the organization, on a permanent basis, of the New England Association of Colleges and Preparatory Schools.

One of the first results of the formation of the new association was the establishment in September, 1886, of the New England Commission on Admission Examinations, a body consisting of one representative from each of fifteen New England colleges, originally organized to maintain and promote uniformity in the requirements for admission to college, but recently invested also with authority to enlarge the scope of its investigations and recommendations so as to include the whole subject of requirements for admission to college and methods of examining.

One of the first subjects to which the newly established Commission addressed itself, was the preparation of lists of books for adoption by the colleges represented in the Commission, intended to serve as a basis for a common requirement in English for admission to college. These lists, which were adopted in 1888, covered the requirements for the years 1889 to 1894, inclusive.

The official proceedings of the annual meetings of the New England Association of Colleges and Prepara-

tory Schools, together with complete transcripts of the papers read, were published, from year to year, at first in the Academy, a monthly magazine devoted to secondary education published under the auspices of the associated principals of the state of New York, and later, when that magazine ceased to exist, in the School Review. Published in this form, the proceedings and papers of the Association were widely read, and soon began to exercise an influence not only in the New England and Middle States, but in remoter parts of the country. A movement which had succeeded in bringing together annually, not merely for conference and comparison of views, but for the discussion and adoption of practical measures for bringing the schools and colleges into mutually helpful relations, was so clearly serviceable that it could not fail to commend itself to interested observers everywhere who suffered from the same evils and were eagerly longing for the same relief.

Accordingly, in 1887, the Schoolmasters' Association of New York and vicinity was organized, and at once addressed itself to the task of bringing about uniformity in the requirements for admission to the colleges and scientific schools within the area of its influence. In 1892, largely through the efforts of this organization, the College Association of the Middle States and Maryland, an association which had been developed from the College Association of Pennsylvania, and which had already been in existence four years, opened its doors for the admission of representatives of secondary schools. From that time, the Middle States Association has been known as the Association of Colleges and Preparatory Schools of the Middle States and Maryland; and, as its

name indicates, its character and aims are substantially identical with those of the New England Association of Colleges and Preparatory Schools. Indeed, almost the only difference between the two associations may be said to be the difference in the geographical area within which their work is confined.

In 1894, and again in 1895, representatives of the Association of Colleges and Preparatory Schools of the Middle States and Maryland, of the New England Association of Colleges and Preparatory Schools, and of the New England Commission of Colleges on Admission Examinations were united in a committee for reforming the character of the entrance examination in English and prescribing the books to be required for admission to college to and including the year 1900.

In April, 1895, the North Central Association of Colleges and Secondary Schools was organized. It includes representatives of the colleges and schools of Ohio, Michigan, Indiana, Illinois, Wisconsin, Iowa, Minnesota, Nebraska, Kansas, and Missouri. At the second meeting of the Association, held April 3 and 4 of the current year at Chicago University, Colorado applied for admission. The Michigan Schoolmasters' Club is an organization having similar objects; but it is limited in its membership to representatives of the colleges and secondary schools of Michigan. In November, 1895, the Southern Association of Colleges and Secondary Schools was organized; so that now the co-operative movement has extended from Maine to the Rocky Mountains, and from Lake Superior to the Gulf of Mexico.

Thus far I have spoken of the organization of associa-

tions of colleges and secondary schools in different parts of the country as traceable to the initiative taken in Boston in 1885 ; and these are perhaps the most direct, the most tangible, and the most practically and permanently useful results of the movement then inaugurated. But the beneficent influence of that movement did not end with the organization of those associations. It was felt and is still felt in the study and discussion of educational questions that have grown out of the reports of the Committee of Ten and the Committee of Fifteen. During the meeting of the National Council of Education, held in July, 1892, a conference of representatives of leading colleges and secondary schools, called by a sub-committee of that body which had already made a valuable report on the general subject of uniformity in school programmes and in requirements for admission to college, was held. The discussions of this conference took a wide range, and the result of the discussions seemed likely to be the formation of a new association whose special function should be the promotion of the kind of uniformity contemplated in the report of the sub-committee to which I have referred. At this point in the discussion, President Eliot, who had entered late, was invited to state his views. He spoke in disapproval of the proposed formation of a new association, and expressed the belief that there were associations enough already existing for the accomplishment of the kind of work to which permanent associations were adapted ; but he added that he had observed in New England that, when representatives of the colleges and secondary schools came together in conference, good was apt to result. He recommended, therefore, that a committee,

duly representative of colleges and secondary schools and of the different sections of the country, be appointed, with authority to call conferences, similarly representative, of experts in each of the several subjects or groups of subjects required for admission to college, and that the committee so constituted, after receiving and digesting the reports of these conferences, should make a final report to the national Council.

President Eliot's proposal met with a prompt and hearty acceptance. The Committee of Ten was at once created, nine conferences consisting of ten experts each were speedily organized by it, and in December of the following year, 1893, the report of the Committee of Ten and the reports of the nine conferences were before the country. The conclusions reached by that committee were not, as is well known, universally accepted, but they were read and discussed from one end of the country to the other; and, quite independently of the value of the direct contributions made by that report to educational theory and practice, it would be difficult to overestimate its value as a challenge to thought on educational questions.

The success of the method of investigation by conferences inaugurated by the Committee of Ten as a means of dealing with the difficult problems of secondary education, very naturally suggested the application of a like method to the solution of the problems of elementary education; and, in 1895, a Committee of Fifteen, appointed by the Department of Superintendence of the National Educational Association, made a report on the training of teachers, on the correlation of studies in elementary education, and on the organization of city

school systems. So wide-spread, indeed, has been the recognition of the value of the conference method of reaching trustworthy results in education, and so popular has the designation of committees of conference and investigation by numerals indicating the number of their members become, that a warning, issued in June, 1895, by a committee of the American Philological Association, against the classical programme of the Committee of Ten, instead of being circulated under a title descriptive of its character and aims, was sent out under the title of "Address of the Committee of Twelve."

Nor have we apparently yet reached the limit of the possibilities of the conference method in the solution of difficult educational problems. In February of the current year, at the suggestion of a committee of the Schoolmasters' Association of New York and vicinity, President Low, of Columbia, called six conferences on as many leading subjects, or groups of subjects, required for admission to Harvard, Yale, Columbia, Princeton, Cornell, and Pennsylvania universities, with a view to the ultimate establishment of uniform requirements for admission to these universities in the common subjects referred to the several conferences. Each of these conferences was made up of six professors and six representatives of secondary schools. The deliberations of the conferences were harmonious and fruitful. The results reached were embodied in reports, which may be found printed in full in the May number of the *Educational Review*. What action the several faculties will take on the recommendations of these reports, it is perhaps premature to say; but we shall probably be safe in assuming that the reports will be accepted by the faculties of

the universities represented in the conferences, and that they will largely determine the scope and content of the secondary school courses of study leading to college within the spheres of influence of those institutions.

The last significant suggestion in the direction of co-operative action that has come to my attention, is that made by President Eliot at the March meeting of the Harvard Teachers' Association, to the effect that a group of six to twelve colleges or universities in the country unite in organizing and maintaining an examining board, whose function should be to prepare admission examination papers, fix the times and places of examination, superintend administrative details, and determine and tabulate the records of the individual candidates for use at the colleges electing to accept such records as trustworthy evidence of fitness for collegiate work in the departments covered by them.

It would be an interesting question, but, in this country, I fear, an academic rather than a practical question, to inquire which is the better method of educational progress,—the method of slow advance, which results from experiment, observation, discussion, reflection, and rational imitation,—in short the method embodied in the apostolic maxim, “Prove all things; hold fast that which is good,” or the method of prompt and radical reform, which, like Athena from the head of Zeus, springs fully matured and symmetrically ordered from the composite brain of a body of educational theorists called philosophers, and is carried into immediate operation by a highly centralized bureaucratic administration in all districts subject to its authority. In other words, which is the better, the American system, which I have

described in the concrete as illustrated in the co-operative movements that have marked the last twelve years of our educational history, or the French system, which, emanating from Paris as one of the indirect results of the Franco Prussian war, has suddenly revolutionized the spirit and methods of school education in France?

I am afraid that much may be said, and justly said, in disparagement of our halting, tentative method of progress; but, whether we like it or not, whether we could devise a better system than that under which we live or not, the fact remains, and will continue to remain, that most of our progress in education and morals, like our progress in civil government, will be made gradually through the method of experiment, observation, reflection and final recognition and adoption of what proves itself the best. New ideas will originate in the brains of individual thinkers, will be applied locally, will be proved by actual trial to be practically feasible as well as theoretically sound, and so will spread by virtue of their intrinsic excellence. It is a slow method of progress; but it is the American, or rather, the Anglo-Saxon method; and we must make the best of it. It is the method by which our forefathers were trained to achieve national independence, by which we are slowly extending the beneficent influences of education to a race that has been degraded by centuries of bondage, and by which our descendants are yet to discover and to assimilate whatever there is that is nutritive to the body politic in the historical, political, social, and economic forces in the midst of which we live.

Nor is this method without cheering promises of hopeful results in the domain of education. Look, for ex-

ample, at the town of Brookline, in Massachusetts, whose education society, made up of the foremost citizens organized for the systematic study of the practical problems connected with the education of children and youth, is the direct outgrowth of the American method of progress. Consider the recent establishment and growth of courses in the various departments of the science of education in colleges and universities whose faculties not long ago seriously maintained that teaching, far from being a science, was hardly an art; that it was rather a happy knack, which some persons possessed and others lacked. That attitude has changed or is rapidly changing, and the change is only another illustration of the silent operation of the American method of reform.

We are not, then, to speak or to think slightly of tentative efforts toward improvement in education. On the contrary, we have every reason in the history of past educational movements to greet such effort with enthusiastic hopefulness. It has been said, and not without truth, that most of the sound and permanent contributions that have been made to educational philosophy were made by individual teachers who were guided to their discoveries by native alertness of mind, genuine sympathy with youth, and an enthusiastic interest in the concrete problems belonging to their work, rather than by the abstract study of psychology, whether old or new. The concrete experiment conducted to a successful issue by a clear-sighted, alert-minded, profoundly interested practical teacher comes first; and the philosopher who analyzes his processes and theoretically justifies them, comes afterwards.

Let not, therefore, the earnest teacher who finds in himself but scant interest in the topics that are engrossing the attention of the professional educators, but who has a keen interest in his pupils and a scholarly ambition to master the subjects he is teaching, despair of his right to contribute something out of the riches of his personal and professional experience to contemporaneous progress in education. There is a field even for him. The thoughtful, scholarly teacher, who, though he knows the difference between concentration and correlation, is not strongly moved to urge these doctrines from educational platforms, who knows the thing called apperception, but is not betrayed by the new label into investing it with magic properties, who knows little and cares less about the subtle distinctions between simon-pure Herbartianism and the modified Herbartianism of the master's disciples, but who perhaps feels within himself something remotely akin to the thoughtful, reflective spirit that animated the great men whose names are associated with current educational shibboleths, let such a teacher, I say, without misgiving, patiently and thoughtfully apply himself to the experimental solution of the problems that lie close to his hand and that come within the range of his acquired powers.

One of these problems that lie close at hand,—the one, in my judgment, on the right solution of which the next forward step in secondary education depends, is the problem of bringing the non-classical high schools—under which term I mean to include not merely the so-called English high schools in whose courses of study Greek has no place, but the four-year non-Greek courses of the ordinary public high school also—into close relation with the colleges.

As is well known, there are many graduates of these non-classical high schools who, without having studied Greek at all, and without having studied certain other subjects required for admission to college to the extent demanded by the colleges, have yet had four years of effective secondary training in subjects that have much to do with the requirements of practical life, and so have reached the stage of mental attainment and training which qualifies them for collegiate work; but who are shut out from the colleges because their high school studies have lain to some extent outside of the prescribed lines which the colleges have laid down as marking the pathway that should lead to the higher education. As nearly one-third of the work done in the non-classical courses does not count in satisfaction of the demands of the colleges,—for example, work done in botany, zoölogy, general history, civil government, drawing, chemistry, astronomy, etc.—such graduates must either relinquish all hope of going to college, or must spend an additional year under private tuition in preparation. The graduates of these non-classical courses whose work in the high school has awakened in them a sense of need and a consequent craving for the higher education, belong to the class of students who have a serious purpose in continuing their studies,—students whose work in the high school has been, and whose work in a college would be, a source of inspiration to their classmates, and whose adult life in a community, if they had enjoyed the advantages of the higher education in their youth, would be an uplifting force. From every point of view, therefore, these promising graduates should be encouraged, by a closer articulation between the non-classical schools

from which they come, and the colleges, to continue their education beyond the secondary stage.

Moreover, this closer articulation should be secured not by the mutilation of the courses of study of the non-classical high schools. It is popularly said that the non-classical high school fits for life, while the classical preparatory school merely fits for college. Whatever may be said by way of breaking the force of this damaging antithesis, there is a truth in it; and the way for college faculties to meet it is by making the school that fits for life fit also for college.

Nor is it either just or expedient to bring about this desirable articulation by making admission to college harder without Greek than with Greek. Some way should be found, and can be found, yes, *will* be found, —I will even venture to go a step farther and say *shall* be found, by which this desirable articulation can be accomplished without damage to the prestige of ancient learning, and yet with full and voluntary recognition of the sterling value and dignity of modern life and thought.

I attended, a few months ago, a preliminary meeting of the Committee on High Schools of the City of Boston, called to consider the question of a possible modification of the high school course of study so that every high school within the limits of Boston might fit pupils for college. I found myself in the strange position of inviting delay. I say that was a strange position for me to occupy; for I have been clamoring, in season and out of season for several years, for a more effective recognition, in the requirements for admission to college, of the non-classical high schools. But I invited delay for several reasons. I knew that the general subject of a new scheme

of requirements for admission to college was under consideration at Harvard University, and that the individual features of that scheme were likely to be determined in some degree by the report of the Committee of Ten; I knew that, in 1894, an effort to secure for the programmes of the Committee of Ten the official recognition of the New England colleges almost succeeded; I knew that President Low, of Columbia University, had recently called six conferences with a view to the establishment of uniform requirements in as many leading admission subjects, and that there was a prospect of fruitful results from these conferences in the near future; and I also knew that several institutions and associations were wrestling with this problem of closer articulation between the non-classical high schools and the colleges. Under these circumstances, I felt that it would be premature and unfortunate for us to mutilate a course of study that had proved itself good, in both substantial content and training value, merely for the purpose of effecting an articulation that, after all, might prove to be temporary only.

Now there is but one way in which mutually helpful relations between the two classes of institutions under consideration can be established. The spirit and policy of isolation can never accomplish it. The sole way of reaching so desirable a consummation lies through co-operation. Happily we are not strangers to this method of progress, and we need no argument to convince us of its efficacy. The only question is To what specific ends is the co-operative spirit to devote itself, and through what channels shall it exert its beneficent activity? Here, too, we are not without guidance.

The report of the Committee of Ten has pointed out a line of approach which, when cleared of a few insignificant barriers that surely cannot prove insurmountable to expert educational engineering, will be found both direct and practicable. "It is obviously desirable," is the language of that report, "that the colleges and scientific schools should be accessible to all boys or girls who have completed creditably the secondary school course. Their parents often do not decide for them, four years before the college age, that they shall go to college, and they themselves may not, perhaps, feel the desire to continue their education until near the end of their school course. In order that any successful graduate of a good secondary school should be free to present himself at the gates of the college or scientific school of his choice, it is necessary that the colleges and scientific schools of the country should accept for admission to appropriate courses of their instruction the attainments of any youth who has passed creditably through a good secondary school course." The committee offer four good secondary school courses of study based on the recommendations of nine conferences composed in nearly equal parts of college and school representatives of acknowledged competence, and add that "the satisfactory completion of any one of the four years' courses of study embodied in the foregoing programmes should admit to corresponding courses in colleges and scientific schools." "This close articulation between the secondary schools and the higher institutions," say the Committee, "would be advantageous alike for the schools, the colleges, and the country."

The recommendation here made has the advantage of

coming not from a local, but from a national source, of embodying the thought and experience not of a few persons selected from a limited area, but of many persons chosen from all parts of the country. If the colleges, while, perhaps, retaining their preferred methods of preparation, should come forward and say, "We will also accept students creditably prepared under any one of these programmes;" and if the school authorities, in a like spirit of co-operation, should come forward and say, "We will adopt at least one of these programmes, the one best suited to our local needs, and will furnish effective instruction under it," the problem would be solved.

A step was taken in this direction—and it came very near being a long step, too—when the New England Association of Colleges and Preparatory Schools, in the winter of 1894, discussed certain resolutions embodying this proposition: that the satisfactory completion of any one of the four programmes offered by the Committee of Ten should be accepted as adequate preparation for admission to college. The effort made on that occasion failed because the Department of Greek of Harvard University entered a protest against the classical programme of the Committee of Ten. This protest, which came as a surprise near the close of the session, and so failed to receive adequate consideration, was at least the primary cause of failure. But the responsibility for failure must, I fear, be shared in some degree by the mover of the resolutions. The amendment proposed by the Greek Department was not vital. It might have been accepted without material injury to the main object aimed at in the resolutions; and it doubtless

would have been accepted if the consequences of rejection could have been clearly apprehended in the brief time given to the consideration of it. But such a defeat ought not to be considered fatal or even serious. Differences of opinion in matters that are not vital should not keep apart those who can work together. Because one attempt at co-operation has failed, through want of alert and tactful management, we will not give up all effort. The establishment of closer articulation between the non-classical high schools and the colleges is universally admitted to be supremely important. What is supremely important is worth striving for, and surely is not unattainable. This is not the time or the place for formulating and discussing a definite scheme for closer articulation; but in due time, and before the proper association, through a repetition of the former effort, or through the adoption of some other more generally acceptable and efficacious method, we shall try again.

No man having put his hand to the plough, and looking back, is fit to take part in the work of directing the forward movement of education.

## DISCUSSION.

The subject was continued by the following paper, by Elmer H. Capen, D. D., President of Tufts College:

Dr. Tetlow has given a clear and accurate sketch of the most important movement that has taken place in education in the history of the country. I do not know that I should exaggerate if I should say it is the most important movement in the entire history of formal education. It is truly remarkable that the whole

account of this movement, its inception, growth, and progress, is shut up within a little more than a decade.

When we recall how much has been accomplished, to what an extent the spirit, character, scope, and in some degree the very conception of the aim of education, have been changed, it seems almost incredible that it could have been achieved in so short a time.

Previous to the establishment of the New England Association of Colleges and Preparatory Schools, and the measures which emanated from that Association, resulting in the creation of the New England Commission on Admission Examinations, these two departments of education were distinctly and sharply separated. Although their fields of operation touched each other at so many points there seemed to be an almost impassable wall between them. The colleges stood apart in lofty seclusion: they were close corporations, subsisting mainly by endowments, and looked with indifference on everything that lay outside of their own immediate province. The secondary schools were public; even when they had private endowments and self-constituted boards of government, they were not fenced about. Their doors were wide open, and they offered generous hospitality to all comers.

The first and most important change that has been effected by the new co-operation movement is the breaking down of the wall of separation. The exclusive spirit of the colleges has vanished. All at once they have begun to look out on the surrounding fields: somehow they have suddenly become conscious, not only that these fields touch their own, but in many respects they are identical with them.

Under the old regime the colleges laid out such courses of study as their governing boards, by a process of a priori reasoning, conceived to be best for men. If the public ventured to criticise them as not adapted to the highest needs of human life, the criticism was treated with disdain. So, too, they set their standards of admission, with a view solely to their own interests and convenience, without even seeming to think that it might be desirable to consult those who were chiefly concerned in conforming to them.

The new spirit amounts almost to a revolution. The present conviction is that the colleges, although they may be private in their support and management, are yet public instrumentalities. They exist for the benefit of the public, and must secure both the public patronage and the public approval. This conviction, no doubt, has done more than anything else to change the character of the college curriculum. The motive in education has undergone a transformation. It is no longer education for its own sake merely, but education for the sake of the people, and of such a sort as is demanded by their vital necessities.

The secondary teacher, moreover, has assumed a new importance. In the eye of the college officers two decades ago, with rare exceptions, the masters and teachers of secondary schools were very indifferent, too often, very insignificant persons whose opinions and wishes were entitled to slight consideration. But all this is now changed. These teachers are recognized in many instances as the most important link in a great chain, and the work they are doing as not inferior in character or quality, to the work of college officers.

In other words, the secondary teachers have gained immensely in dignity and power. No serious modification of existing schemes or programmes of education can be proposed, no new scheme or programme can be devised, without heeding their suggestions, and inviting their assistance.

Again, the movement which Dr. Tetlow has described, has made the influence of the higher institutions upon the lower felt more distinctly than ever before. It has long been an aphorism in education, that influence proceeds from the top downward. The standards set by the colleges and universities, even in their most exclusive era, have undoubtedly reacted powerfully on the work of the lower grades. The facilities furnished by large endowments have, to a very great extent, stimulated the desire of those who were working in the lower and humbler ranks, to avail themselves of the higher privileges. But in too many cases ambition and desire have died because men did not know the way, and not unfrequently, when they have persisted, it has been only by a kind of blind groping that their ends have been realized. Now, however, the higher institutions have put themselves into close and vital touch with the public schools, not only giving practical suggestions, but pointing out the way.

The declaration of the Associations of Colleges in New England made at Providence, concerning the nature and order of studies, even in grades below the high school, and the work of the Committee of Ten which has already borne important fruit, are striking instances of the change that has been wrought, amounting, as I have already said, almost to a revolution. Indeed, the

transformation is so vast that even those who have been in it and are really a part of it, can but poorly comprehend it.

But I think that a much more important service rendered by the movement consists in the broadening of the conception of liberal education. Formerly they only were regarded as liberally educated who had received during a definite period, instruction in a definite curriculum. It was believed that the humanistic element of liberal culture was absolutely confined to certain courses of study, and could not exist in any others. To suggest that it might be found in other studies even by a marked increase of time, was to utter the rankest heresy. But various changes have introduced a new notion. The existence of a vast body of scientific men, who, while they have discarded the old methods of instruction, have shown themselves to be men of breadth and force of intellect, together with the introduction of what is known as the scientific method of instruction, the immense increase of the elective system, for the promotion of which, President Eliot, of Harvard University, is to be accorded the highest praises, and the stimulating effects of various and widely different subjects and forms of study, have all combined to cause the question to be asked again, "What constitutes a liberal education?" and "What studies may be appropriately termed liberal studies?"

In the light of our most recent experience the answer to these questions is swift and sure. That is a liberal education which calls forth the best that is in men, and those studies are liberal which not only make the highest and most powerful appeal, but which enable men to un-

derstand and fulfil in the broadest and most comprehensive way their duty and relations.

Of course it is absurd to claim, under these definitions, in behalf of any set of studies a monopoly. Obviously what would appeal to one class of persons might fail altogether with another class. The characteristics of the person to be educated will often times have as much to do with determining the nature of the things to be studied, and even the methods to be pursued as anything else. Notwithstanding the frantic protest of the *classicists*, the time has already arrived when it is recognized as possible for men to obtain a liberal education in more than one way.

The effect of this has been to widen the constituency of the colleges. Until recently the colleges have said that whoever would enter their sacred enclosures for instruction, must enter by a little narrow door. He who ventured to climb up some other way the same would be a thief and a robber. Many, however, are beginning to see, that the position is illogical and untenable. If there is more than one way of acquiring an education within the college, then there must be more than one avenue of approach.

The great body of secondary schools, with their widely varying programmes, must be the sources from which the colleges are to be recruited. The colleges will fail to discharge their highest function unless they recognize these programmes, in so far as they are substantial and serve to open the minds of the pupils and fit them for the work which the colleges are expected to do.

It is no longer reasonable to assert that there is only one set of pupils who have any right to the advantages

which the colleges offer. It is the indefeasible right of the higher intelligence to choose its own method of culture. Really the colleges ought to rejoice that they are permitted to gather their intellectual children from every quarter, and they ought to press forward like the parent in Holy Writ, and greet them with ornaments and sumptuous robes as they eagerly come seeking sustenance and shelter.

With the increased interest in higher education, which has been so marked within the last ten years, increasing enormously, not only the number of those who enter the high schools from the grammar grades, but those who tarry in the high schools until their graduation, it ought to be possible very soon to secure a much larger percentage of these pupils,—perhaps it is not too much to hope to command a majority of them to take up and pursue the higher courses of the college.

The colleges and universities of New England should be so closely articulated with the system of public education, that it would be possible for the child entering the primary school to have his eye on the very highest step in the ladder, and never remove it until his feet have pressed it: at all events, the break between the high school and the college should not be any more abrupt than the break between the grammar and the high school. Pupils should find it relatively as easy to keep up the continuous movement in one case as in the other. Until this is accomplished I cannot feel that we have a right to any great satisfaction in our system of education.

This result seems all the more urgent when we remember the extent to which specialization has been carried

already, and that more and more it is likely to characterize the education of the future.

The all round scholar is almost a thing of the past. The type to which Francis Wayland, James Walker, Theodore D. Woolsey, Mark Hopkins and Andrew P. Peabody, belonged, has almost vanished. It was a grand type, perhaps the grandest that has been or ever will be produced, but the times have changed. The exigences of study, and the demands of the world for particular kinds of training, have changed. The schools of every grade must meet the new conditions. Among these new conditions is the possibility for men and women in numbers greater than it has yet entered into the heart of man to conceive, to take up and carry forward to great and profitable results, some of the constantly multiplying and almost endlessly varying specialties. But, in order that these may not be stamped with crudeness, it is essential that they should be built upon the broadest foundations possible. In other words, the training that precedes specialization should be thorough and profound. It is only thus that the new scientific callings can take and maintain their place among the learned professions. All hail! then, to the new movement in education! Let it go on until it has swept into its bosom every youth and maiden who is capable of the higher culture.

## II.

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### **A STUDY OF AMERICAN NORMAL SCHOOLS.**

BY FRED W. ATKINSON, PH. D., PRINCIPAL OF THE  
SPRINGFIELD, MASS., HIGH SCHOOL.

It may be said, without much danger of contradiction, that the most important educational problem of the day is how to obtain a better class of teachers for the public schools. Nearly every state in the Union has established for this purpose one or more normal schools. Unsatisfactory as the teaching force may be, it is far better because normal schools have existed. They have not been a "disappointment," as is so often asserted by those engaged in higher education. The results which they have attained would satisfy, I am quite sure, the hopes of those who assisted in their foundation. Let us admit that they have done a great work, and ask, have they kept pace with advancing ideas?

With this question in mind, I approached this study. It may seem strange to some of you that a secondary school teacher should undertake the present task. Especially venturesome does such a critical study by a layman seem when one reads in the educational papers that "the people who criticise the normal schools are, as a rule, those who know least about them," that it is quite the sad with some people to decry the normal

schools of the country," and "that this seems to amuse those who decry them." As a graduate of a normal school, which must stand, I think, among the first six or seven best in this country, I am a firm believer in these institutions. I am convinced, however, that these institutions can do a great deal more for our public schools. My study of this question is based, in part, upon data obtained by circular letters from over one hundred superintendents, twenty college presidents, and about as many college professors of education. To obtain the details of organization and management, course of study, requirements for admission, degrees conferred, and the like, catalogues were sent for, and over fifty of them received. Catalogue information is, I realize fully, not altogether satisfactory. An experience gained from a four years' stay at my own alma mater, and from an intimate study of three other normal schools in this country, as well as a prolonged inspection of some half-dozen of the best European teachers' seminaries, has, perhaps, assisted in interpreting and supplementing my catalogue study.

The replies of the superintendents show, it seems to me, a proper appreciation of the merits and defects of the normal schools about whose graduates they give direct and full testimony. The college men, on the other hand, expect too much; they fail to realize under what hampered conditions often, normal schools labor. It may be true, also, that these schools attempt too much, and fail, themselves, to realize their limitations, and thus repel those engaged in college instruction. For years the college authorities hesitated to accept the idea for which the normal schools stood. Now, however, in in-

troducing departments of pedagogy, they publicly, although largely unconsciously, champion the normal-school cause. Notwithstanding this fact, there are, unfortunately, signs of a more or less strained feeling between colleges and the institutions of which we are speaking to-day. The answers from the college presidents and professors, while often unfavorable, and, in general, too severe, nevertheless give much that is hopeful and suggestive. The ideals which they throw out make them especially valuable.

In what follows, an attempt will be made; first, to give something of the present condition of our public normal schools; and second, to suggest plans whereby their effectiveness may possibly be increased.

When the American Institute of Instruction was founded in 1830, there was not a public normal school in this country. The first public normal school in the world was established in France in 1775, and the first in this country in 1839, at Lexington. There were in 1893, according to the returns made to the Bureau of Education, 121 public normal schools, 1,310 instructors, and 27,926 students pursuing teachers' training courses; there were also in these schools, 17,777 students not in these teachers' training courses; so that only 61 per cent. of the total number were preparing for the office of teacher. More than two millions of dollars was appropriated for their support. Only a small portion of the teachers of this country are normal graduates. In New Hampshire only 17 per cent. have had normal training; in Rhode Island, 70 per cent.; and in New England as a whole, about 30 per cent. In Ontario, just across our border, every elementary school is in the hands of a

trained teacher. Our normal schools present great differences; for example, that in Drain, Oregon, has fifty pupils, two teachers, and \$1000 as an annual appropriation from the state; that in Ypsilanti, Mich., 937 pupils, 37 instructors, and a state appropriation of \$50,000.

Normal schools hold no organic relation to the system of public schools, and yet they may direct largely the organization and methods of these schools. Also, they may help to create and sustain a high standard of educational work. They may be spoken of, as serving as a "driving force" and a "balance wheel" to the whole elementary school system. Through the normal schools, and the system of superintendents, we may have the two best means of elevating the character of our public schools. It is easily possible for both to become deadening rather than vitalizing factors. Under most favorable conditions, normal schools wield an influence second to that of no other class of educational institutions.

The utter lack of uniformity in courses of study and requirements for admission which characterize secondary and college instruction is not inapplicable to our normal schools. In fact, individual normal schools present so many peculiarities that it is difficult to classify their general characteristics. To criticise them as a class may seem hardly fair to the half-dozen superior ones. It may be said, for example, that the practice work is not of the right sort, and yet the normal school at Plymouth, New Hampshire, has a most excellent plan of reducing theory to practice. The principal, as most of you know, is at the same time in charge of the public schools of the city. This plan for practice is, however, the exception. Again, the normal school in Worcester, Mass., is one of a small

number which have felt in a marked way the beneficial effects of a well-directed and sympathetic study of children. Texas is alone in following the Prussian plan of making lodging, heating and lighting free for her students, as well as tuition. Traits like these, may not always appear in the composite picture which results from a study like the present one. The picture, notwithstanding, may be a true one.

The normal school of Kansas has a productive endowment of over one-quarter of a million of dollars; several others in the West and South have small endowments. Normal schools are, however, usually supported by legislative appropriations. The normal schools for the colored people of the South receive, also, a part of their support from the Peabody and Slater funds. In most states, the state board of education controls their general management. These boards have, more or less, a political character, with more or less harmful results upon the schools themselves. It is especially objectionable when principals and teachers must be appointed by these boards of control rather than by the State superintendent of education.

Some normal schools take pupils before the elementary course is fully covered; others, at its completion; and a few require a high-school diploma. "A fair knowledge of the common branches" is the usual catalog statement of the requirement for admission. Massachusetts requires a high-school education or its equivalent; but it does not as yet give a rigid examination. High grades for admission were required in this State; but the results were reported as disappointing. Assumption is usually made by the principal that the

presence of a student at their doors indicates that he has a "call" to teach. California and Massachusetts require something of a personal examination.

The function of the normal school is variously interpreted. In North Carolina and Arkansas, it is to perform what is usually done by the summer schools of methods. A larger part of the program with the majority is devoted to secondary studies; the little that is professional is sandwiched in. With others, all is academic preparatory, until the last year, which is solely professional. In case of only a few is the work strictly professional in character. The term "strictly professional" comprehends very properly the *review* of the elementary and secondary studies if done with a view to the methods of teaching them. About three-fourths of the schools studied, introduce to their students their first ideas of academic subjects. It would seem as if one might say, justly, that the average normal school curriculum requires much surface, and permits of very little depth. The elective principle has but little play. As a usual thing, the normal school course does not lead to college, and yet in the West there are normal schools whose diplomas are accepted by neighboring so-called universities as certificates of admission. There is a small class not out West, either, which claims to fit for teaching, and at the same time for college, more economically and effectively than the high schools. One might as well say that the two sides of a right-angled triangle are shorter than the hypotenuse. Some even call themselves colleges; and their graduates with the dignity conferred by a degree do not feel that a real college would give them anything more in the way of a preparation.

Nearly all the schools teach psychology, and about two-thirds of them speak of the history of education. School law, school economy and school management are mentioned in most of the catalogs, but very little time is allotted to these subjects. In nearly all some opportunity is furnished for observation of school work, and in many for practice work, as well. Chancellor Payne of the Peabody normal college, at Nashville, Tenn., is strenuously opposed to practice-teaching; and Col. Parker, of the Cook county (Ill.) normal school, characterizes observation of school-work as a "delusion and a snare." Looking over the field at large, it would appear that intending teachers are not given sufficient opportunity to teach under actual school conditions. In this one particular the city training schools are superior to the normal schools.

It is to be pointed out that, although their function is to fit teachers for the elementary schools, a broader field is entered: and nearly all normal schools may well be classed with secondary schools. The result is, as an eastern man puts it: "The average normal school is an imperfect substitute for a high school." However much one may dissent from accepting this statement in full, yet no impartial judge can deny that in attempting to supply the lack of a broad educational qualification, and train in methods at the same time, the normal schools have done neither well. It is in every way a disastrous combination of courses of study, resulting only in a confusion of aims. There is no lack of testimony on this point. From a state in which there are several representative schools, a superintendent, whose field of activity is in the neighborhood of the best

known of these schools, writes: "Their professional training is little more than a varnish over their academic training." With fewer exceptions than could be wished, both superintendents and college men make the trenchant criticism: "Normal students have low ideals of scholarships." Because of the poor preparation of their students, these schools attempt merely to give them certain devices and methods, and not full enough instruction in the principles of teaching. This appears to the practical school men like putting the "cart before the horse." Getting the form rather than the content, too many of the graduates are like David trying to use Saul's armor. I do not ignore the fact that there are hundreds of graduates who are intelligent, self-directive, and in no sense imitators. The weight of testimony shows that the professional instruction proper is very often superficial, crude, and hardly more than the minute, logical sub-division of the material of elementary instruction.

As regards the art of teaching itself, it is noteworthy that criticism is passed by superintendents upon the graduates of the very normal schools which have practice departments that there is a failure on their part to put their theories into practice. The need of more training in general school management is often pointed out. By the superintendents of no state is the inadequacy of the facilities for practice so strongly emphasized as by those of Massachusetts.

Though there may be defects in the normal courses as usually pursued, yet the graduates, other things being equal, have an advantage over inexperienced persons. It is frequently reported that the estimate put upon

this advantage by its possessors is too high. As an instance, a man on the Pacific slope says: "Normal teachers are too apt to think that they have learned about all there is to be known." Normal schools themselves too often impress their graduates with the idea that they are "finished teachers," and thus do them an incalculable injury. The best lesson a normal senior can learn is that he is not "fitted to teach anything anywhere." Addison said: "A great deal of knowledge, which is not capable of making a man wise, has a natural tendency to make him vain." Possibly herein we have the explanation why self-complacency in a peculiar degree characterizes the average normal graduate. At the dedication of the Bridgewater Normal School building, in 1846, Horace Mann's last words to the pupils of the school were: "Never pride yourselves upon these advantages. Think of them, not as points of superiority." Possibly Horace Mann was in this, as in other educational matters, something of a prophet.

I shall introduce my next topic in the words of another, who was himself at one time a principal of one of our New England normal schools: "Much of the criticism against normal school," he says, "is altogether too well founded, owing to the calibre of the teachers employed and the character of the instruction given. It is a noticeable weakness that too many of the teachers are not a whit above the average found in our best grammar and high schools,—they could be duplicated easily." I give the testimony of another normal school teacher: "Instructors in the normal schools, while in the main, earnest and pains-taking teachers, are apt to be selected as the exemplars of a rigid routine which has destroyed their own person-

ality. Their specialty is 'method,' and too often this 'method' becomes a madness. They are the disciples of some one idea, which idea is expanded, expatiated upon, shown in different lights, and made to do duty as lay figure in all possible cases." I fear that the two preceding statements are too well founded on facts.

The men and women who teach in these schools are, as a rule without a college training. Far too many graduates are engaged, either at graduation or a year or two after, as teachers, with the result that faults are repeated, and no new ideas are brought in. This means also we are coming to have in our normal schools a fairly large body of instructors, who are training persons to teach in the public schools, although they themselves have had little, if any, experience in public school teaching. The salaries paid by the states are not sufficient to command the highest teaching ability. A charge is made by several schoolmen, which if true is very serious. "Normal school instructors, especially principals, do not know the public schools as they exist to-day." This is, undoubtedly, a tendency to be counteracted.

To sum up thus far, we may say briefly that the work of the normal schools, being never subjected to any external test,—as secondary schools are tested by the colleges, for example,—has gone on from year to year in narrow channels, and is probably less efficient than even the most conscientious of the teachers of these schools suppose it to be. There are, both within and without New England, efficient normal schools; but my study has convinced me that the ratio of such schools to the whole number of normal schools is small.

What then shall normal schools do to get in line with

our other educational institutions? The one thing needful is an extension of the professional work, and a retrenchment of the academic work. Enrich the former, and limit the latter to a re-examination of both elementary and secondary studies in the light of the professional work. More schools than do, could refuse to admit any but those who have had a high-school course. In this respect, they might well follow the example of the larger number of city training schools. The Committee of Fifteen, in the report of its sub-committee on the training of teachers, state their belief that this is the minimum acquirement that can generally be accepted, and that it is not too much to be rightfully demanded. An attempt should be made to correlate the high schools with the normal schools. In time, in all normal schools the notion of a ladder from the elementary school to the university should prevail. Promising students at the present time should have held out to them the possibility of further study at the higher institutions. Scholarships should be established at the colleges either by the States or the colleges themselves. This was done at Harvard College some years ago at the instigation of Agassiz. It is only within a year or two that the Massachusetts normal schools have brought these eight scholarships to the attention of their students. During no year have they all been taken advantage of by Massachusetts' normal graduates, for whom they were originally intended.

Above scholarship in the intending teacher, or any special training, is to be placed the personal make-up of the man himself. We have only to recall in this connection, Pestalozzi, the most ignorant of men, who boasted that he had not read a book for forty years;

but who because he loved his pupils, found a way to teach them through observation of the common things about them. The scholarship of George Bancroft did not keep him from being a perfect failure as a teacher of young boys. He was by temperament and lack of sympathy with the feelings and ways of young boys, disqualified ever from winning their regard and from being helpful and stimulating to them. The harshest criticism of normal instruction that I came across, was in the Educational Review over the signature of Chancellor Payne of the Peabody Normal College. He says: "I think that it must be admitted by all impartial observers that normal-school training has not been favorable to the development of personal talent and power in teaching."

Persons, who, on first appearance or later, show no aptitude for teaching, should be excluded. There is no use of wasting the State's money on those not capable of profiting by it. Moreover, to send out persons without natural qualifications for teaching, is unjust to the teachers at large, and to those who are "mal-taught." The student once admitted, proper weight should be given to individuality and originality, and thus the best answer will be given to the severest critics.

If I were asked to give the highest function of the normal school, I should say that it was to put its students in the right attitude toward the office of the teacher. They should come to this, not alone through books, but through the child himself. They should see in the child, the ideal,—the thing possible. Naturally this only comes through discipline. As a part of the professional training, they should be brought more in

contact with the natural child, and required to make a closer study of how a child receives knowledge rather than learn from books how an adult mind thinks he does. Child-study, so-called, which is so much of the nature of a scientific investigation that it leaves out the element of loving sympathy with child-life, belongs more properly to the university. In their observation in the model school, students should be directed to watch not only the method of the teacher, but the attitude of mind of the pupils as well, and especially to note how the teacher *adapts* his methods to the pupils' mental attitudes.

The Report of the Committee of Fifteen presents an excellent plan for a two years' course of professional training. Its equal division of time between theory and practice should recommend itself to every one. Physiology and hygiene are not mentioned; these subjects might well be included in the science of teaching. Instruction in school economy should cover, even in the elementary normal schools, more, I believe, than merely the "outlines and fundamental principles," as is recommended in this report. Normal students, with a high school training before admission, will be of sufficient maturity to study school law, school organization, school management, and something of school systems, both at home and abroad. The report makes a safe recommendation concerning the position and character of the history of education. I should have been glad, ten years ago, to have gotten the mental breadth which must come, even from a study of the outlines of this subject. During my normal school days I never heard the names of Herbart, Rousseau, Comenius or Pestalozzi, to say noth-

ing of a host of other educators equally valuable to study. The history of education should take a more prominent place than is given it. The need of broad views and high ideals is an obvious need of him who would teach others. Interest, enthusiasm and sympathy will come from a study of children if under sympathetic and competent supervision; culture of the highest kind, exalted ideas of the teacher's profession, and sound judgment from a study of the history of education, if properly taught. For the normal student to come to a definite conception of a high ideal, and when he goes out to keep resolutely to this ideal, is to possess a source of an ever increasing interest in his daily work. On the other hand, for the young teacher to hold fast to any special system of methods is to get into a routine, and find teaching commonplace. The study of a chronological series of educational biographies from a text-book will result in but little good. Only the most important men should be selected for study; and, as far as possible, these should be to the students living pictures. The most interesting and important educational movements should be studied. Questions should be put to the class to bring out certain principles applicable to present conditions. Comparisons between educators should be made and differences pointed out. The skilful and enthusiastic teacher will find ways of indirectly arousing ideals in their students, and thus influencing their characters and their future teaching.

The greatest need of the normal schools, next to a higher standard of scholarship is more actual teaching and governing under skilled supervision in schools under actual every day conditions. The New Britain (Ct.)

normal school, with its South Manchester annex, represents, perhaps, the high-water mark of what is a practical training. First, the students observe a great deal under competent supervision ; second, they give lessons while observing ; third, they act as apprentices ; and fourth, they have independent charge of pupils for at least four or five months.

The New Britain plan furnishes such conditions as to make it possible to test thoroughly the ability of each student to interest, control, and direct children in their thought, work and activities. More of our normal schools should make arrangements with neighboring cities or villages so that it would be possible to give their students the regular, natural conditions of the school-room. There would be no excuse then of graduating any one who had not shown fitness to teach.

If our normal schools are to meet the demands made upon them, the state legislatures must appropriate more money for their support. For instance, salaries for principals should range from \$4,000 to \$5,000, rather than as now from \$2,000 to \$3,000. If a normal principal is thoroughly competent, he should be given a salary commensurate with his great field of influence. No superintendent, and certainly no high school principal, has it within his power to do as much good, educationally speaking, as a normal principal working under the most favorable conditions.

Great executive ability and a varied teaching experience are two necessary qualifications for one who aims to be a successful principal. He must possess also a large heart and broad culture ; he must be genuinely interested, and a leader in educational thought and practice. It

goes without saying that he should keep in closest touch with the public schools; he should know in what particulars his graduates are strong, and wherein they fail to respond to the demands of their positions. They should look upon superintendents not as their critics, but as their co-workers.

Better salaries would allow a strengthening of the teaching forces. The instruction throughout might then be broader in scholarship and more natural and progressive in spirit. That was a noble saying of Dr. Arnold, "I prefer that my pupils should drink from a running stream rather than a stagnant brook"; and its principle is capable of special application to a teacher of teachers.

In conclusion, normal schools cannot *make* a teacher, but can *help* a teacher to make himself. Above all else, normal schools should develop a broad human sympathy and a permanent professional attitude. Their very atmosphere should bring home to every young teacher the familiar words of Coleridge:—

O'er wayward childhood would'st thou hold firm rule,  
And sun thee in the light of happy faces,  
Love, Hope and Patience, these must be thy graces,  
And in thine own heart let them first keep school.

#### DISCUSSION.

The subject was continued by Principal Charles C. Ramsay, of the B. M. C. Durfee high school, Fall River, Mass., as follows:

Through some fault of the mails, I have not had the advantage until a recent moment of glancing at Dr. Atkinson's able presentation of the theme under con-

sideration this morning. Aside from its merits, the chief thing I have learned by a hasty persusal of it, however, is the uselessness of my participation in the discussion of the subject, by reason of my substantial and hearty agreement with the positions advanced in the paper, with one or two exceptions to be noted later.

With these preliminary words, I will proceed to express the thoughts that have occurred to me upon the subject, which—under the circumstances already described—must be in the nature of an independent treatment of the topic—a discussion of the subject rather than of the paper.

The occasion of my speaking is the urgent invitation of our worthy president; my apology for accepting it are the facts that—before my course at the university—I graduated from an important State normal school, was for some time instructor in pedagogics in a college in the north central States, and have had a varied experience in elementary, secondary, and higher instruction. I mention a matter thus personal to myself, merely to assure the normal school people that I do not speak as an outsider but as a warm friend of such institutions.

Despite the criticisms of some college and secondary school men, and of other persons skeptical of the work of normal schools, I am glad to affirm the belief that they have accomplished great good in every State in which they have been established and supported. They arose to meet an important and legitimate demand in this country, and in several ways they have performed some of their functions in a satisfactory manner. Even where a State normal school has seemed but an inferior high school, it has rendered by its very existence a far

more important service to the cause of education and the vocation of teaching than a high school could have done. However poorly equipped or administered, State normal schools have stood for an *idea*,—an important idea ; namely, that special preparation of some kind is demanded and required for the business of teaching. Before normal schools were established in the United States, there was no outward evidence that a teacher needed more than general scholarship—and not much of that—to follow his occupation. A state normal school exerts a stronger influence than a good high school, moreover, because as an institution it is always a more imposing unit. It appeals more to the imagination of the youth entering its halls as students. It is not, like a high school, a *local* institution. The State—the commonwealth—is behind it, and lends to it whatever more of dignity the State has than the town or city. They have been of greater benefit to the lower schools, also, because by sending their graduates into communities of which they are not natives or residents, they have prevented to a considerable extent the pernicious “inbreeding” of teachers who are the products of their own defective school systems. Normal school graduates are, moreover—as a rule—persons of stronger character than the average high school graduate who goes directly into teaching.

Even though the students and graduates of many normal schools have not there received the best training and highest ideals for their work, these schools have accomplished more than high schools for the cause of education ; for their students and graduates become citizens, parents, and members of school committees ; and are,

by reason of their attendance at normal schools, wiser and warmer friends of education. You will remember that it is a strong conviction of Mr. Herbert Spencer that there should be schools for the education of parents, in which the chief place should be assigned to the philosophy and method of education.\* You well know, moreover, the great service of kindergarten training to mothers; the same has often proved equally true of normal schools in their influence upon pupils who afterwards have become parents. This influence has spread even beyond the home and has benefitted the Sunday school. "Said a keen observer not long ago: 'I have noticed that, when by accident, a rich man's daughter is led to take a session or two at a normal school, she returns home with the conviction that teaching is the noblest calling in which a human being can engage. Even if she is afterwards persuaded to exchange this vocation for that of matrimony, she never loses her estimate of the dignity of teaching: and so long as she lives she is never satisfied unless she has charge of a class at Sunday school.' The professional spirit which students imbibe in the atmosphere of normal schools, the zeal which these schools infuse, the stimulation which

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\*\* No rational plea can be put forward for leaving the art of education out of our curriculum. Whether as bearing upon the happiness of parents themselves, or whether as affecting the characters and lives of their children and remote descendants, we must admit that a knowledge of the right methods of juvenile culture, physical, intellectual and moral is a knowledge second to none in importance. This topic should occupy the highest and last place in the course of instruction passed through by each man and woman. *The subject which involves all other subjects, and therefore the subject in which the education of every one should culminate, is the 'Theory and Practice of Education.'*" —Education: Intellectual, Moral, and Physical, pages 150 and 151. New York, 1885.

they give, the interest in childhood, and the love for children which they create,"\* form a powerful influence for good in every community where normal graduates reside, whether engaged in teaching or not.

State normal schools have, however, performed a service in this country of a more general—though not less important—character than those hereinbefore indicated. To them have come—especially in the central and western states—very poor, but very worthy and aspiring young men and women, whose early school advantages were slender and inadequate, but whose earnest desire for something better, and enthusiasm for a wider and more useful life, were boundless. These youth have met others of the same quality and tastes from widely different localities and environment, and coming under the inspiring influence and intellectual guidance of teachers better than they ever had before, they have been lifted permanently to a higher plane of thought and life. To such noble youth the normal schools have been an open door—the only door—of opportunity to begin the higher intellectual life, and the stepping-stones to efficient service in their states and local communities. Whether as private citizens, or later as graduates of colleges and universities, distinguished educators, members of legislatures or of Congress, they owe a great debt to the normal schools.

As everybody knows, the first state normal school in the United States was established in Massachusetts, the

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\*From an address, by Nathan C. Schaeffer, LL. D., State Superintendent of Public Instruction of Pennsylvania, before the Normal Department of the National Educational Association, at Denver, Colorado, July 12, 1895.

great mother of schoolmasters; but it was not many years afterward that a Massachusetts man—David P. Page—was invited to organize one for the state of New York. Since then almost all the states of the Union have likewise followed the example of Massachusetts. The state normal schools of the country have been modelled upon one or the other of two pretty distinct types: the early Massachusetts normal school, in which the accent was (and still largely is) strongly laid upon what is called "*thoroughness in the common branches*"; and the Oswego (N. Y.) state normal school, in which great emphasis has always been placed upon "methods and practice of teaching." The former has always made much of minute and accurate analysis of subject-matter; the latter of the orderly and logical arrangement of the elements of knowledge for the purpose of presentation in such a way as to secure discipline and development of mental faculty. The Oswego state normal school—and others modelled upon it—has from the first felt and expressed foreign—chiefly English and German— influences, the influence of Pestalozzi and older educational reformers. This type of normal school has always made more of educational theory, and especially of practice-teaching by the normal school pupils, than has the Massachusetts type. Incidentally, the very name chosen for the Oswego normal school indicates this fact: "State Normal and Training School."

Notwithstanding the great service and distinctive merits of state normal schools, they have, however, come far short of doing all the good they could and ought to have done. With few and temporary exceptions, they have not been leaders of educational thought and pro-

gress. As a rule, they have neither originated nor executed important movements in education ; nor have their instructors, with one or two exceptions, written the epoch-making books for either teachers or pupils. The atmosphere of normal schools is and has been one of too much method and too little matter ; of too much form and too little content ; of too much shadow and too little substance. Under the conditions, and on the principle, on which they have been conducted, it has been inevitable that a certain barrenness of ideas should result from the threshing out of so much old straw, from ringing the changes upon so many mechanical rules for teaching and managing schools, from the endless pedantic subdivision of things that do not differ in order to "pad" professional subjects derived from abstraction rather than from concrete and scientific observation and inference. Even in some normal schools where there have been sincere efforts to do something better for their students' professional preparation by instruction in psychology and the philosophy of education, normal school instructors have often squeezed the life out of these subjects by metaphysical abstractions and many useless distinctions.

Many of the academic instructors in normal schools either have had no practical experience as teachers in elementary schools or have lost their familiarity and touch with them. If a normal school has model and practice-schools—as all normal schools should have—the normal instructors should not infrequently teach classes in the presence of the pupil-teachers in the elements of their respective subjects in these schools. Too often normal school teachers are not liberally educated. No person who is not a college graduate should be employed to

teach in a normal school ; but I will go farther, and assert that no person who besides being a college graduate is not also a graduate of a normal school or other professional school or department for teachers should be employed to teach in a state normal school. Today, however, there are even principals of normal schools—some of them young men, and apparently without excuse, in view of the opportunities for liberal culture and professional training—who lack either the one or the other qualification just named. Such facts are indefensible and doubtless largely explain the weak influence and defective service of normal schools in the educational world today.

The principal and the teachers of normal schools have, moreover, often failed to sift their students in order to retain only those possessing the aptitudes for teaching. In such cases, the absence of downright frankness and open-hearted sincerity on the part of normal school authorities is well-nigh criminal ; certainly, it works unspeakable injury to the children and to the state. Only those of unimpeachable moral character who love and sympathize with youth, while not condoning or indulging their faults, and have the power of skilful instruction and effective drill, should be allowed to remain as students in the normal schools and later enter the ranks of teachers.

Although many normal schools are weak in their instruction in educational doctrine and inadequate in their provision for actual practice in teaching, yet their greatest sin is perhaps their low standards of scholarship. Stripped of all verbiage and useless and complicating distinctions, the problem of education is a simple one. It

is stimulation of life, the transmutation of knowledge into character and culture. The keynotes of true education, as they are also the evidences of the truly educated person, are power and love,—the love of learning, the love of truth, the love of the good, the love of the beautiful, and the power to make ideals real. The great educators of our race have been the men and the women who, seeing deepest and farthest into nature and life, have been impelled to cause their fellows to see what they have seen, to feel what they have felt, and to do what they have done. While I do not wish to be understood as underestimating the value of educational theory and method, you will readily see that I attach great importance to learning and the love of learning in the teacher. To complete living there are perhaps three births: the physical, the intellectual, the moral or spiritual. No man truly lives who has not entered upon the intellectual and the spiritual life, which are "the contagion of noble minds."\* Such a man possesses culture, that subtle thing which can be more easily felt than defined. Even Plato's conception of a man of culture is a description rather than a definition: "A lover, not of a part of wisdom, but of the whole; who has a taste for every sort of knowledge, is curious to learn, and is never satisfied; who has magnificence of mind and is a spectator of all time and all existence; who is harmoniously constituted; of a well-proportioned and gracious mind, whose own nature will move toward the true being of everything; who has a good memory, and is quick to learn, noble, gracious, the friend of truth, justice, courage, temper-

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\* An apt phrase applied to the love of letters by Chancellor Payne in "Contributions to the Science of Education," page 296.

ance."\* In the life of an intellectual man, a man of culture, the love of letters is no unimportant element.

Of all men, surely the *teacher*—the former and trainer of youthful minds—should live the intellectual life; but, measured by this standard, what shall we say of thousands of our American teachers, some of them graduates of normal schools, who seem to regard their vocation as a trade by means of which they purchase—I will not say earn—a livelihood, at the least outlay of energy and effort?

To secure a high grade of scholarship, every state normal school ought to insist on two things: (1) a high scholastic standard of admission; and (2) a high scholastic standard of graduation. The Massachusetts State Board of Education did right in requiring graduation from a high school as a condition of admission to a state normal school, and the authorities of all other state normal schools should follow its example at the earliest practicable moment. The standards of graduation of every high school should, however, be inspected before being placed upon the approved list of high schools whose graduates may enter the state normal school: for we must yet reckon with school committees, who are not in the matter of graduation always free from the influence of local or domestic politics. In fact, the state normal schools ought, besides requiring candidates for admission to possess high school diplomas, to subject them to some sort of examination, both oral and written. Of the subjects a knowledge of which should be required for admission, I think that—in addition to a

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\* "Republic," 475-487.

thorough training in English for four years in a secondary school—every candidate should be required to present evidence of four years' study of Latin and at least two years of French or German; but lest this seem too rigorous, or in some cases impracticable, I would say that every candidate for admission to a state normal school should have studied at least three years one language other than his own.

Graduation from a reputable high school, or equivalent scholarship, should be required as one condition of admission to a state normal school, first on the sound principle that a teacher should be educated in an institution of a higher grade than that in which he is to teach; and, further, because the requisite general scholarship of a prospective teacher should be obtained while not under the stress of a practical end (that of professional training, which should be the dominating purpose of the normal school), which is always destructive of liberalizing culture; and, again, because somewhere in the school-life of the members of every profession, especially that of teaching, they should come in contact and association with persons who are not and will not become members of their own profession. The reason is so obvious as not to require expanded statement: breadth and generosity of mind come, in part, from wide and varied familiarity, through personal acquaintance, with the minds of persons in varied stations and diverse pursuits in life. After admission, the normal school student should be required not only to re-examine elementary and secondary school subjects, with a view to teaching them, but also to push his attainments in them much farther than it was possible for him to do

before with reference to the difficult points in subject matter and its underlying philosophy. In other words, their study of school-subjects should now be rigorously scientific, for which their maturity and preparatory training will be adequate. I favor such a requirement in normal schools, not only because law and medical schools teach the *what* quite as much as the *how*, but also because the growing mind—even of the prospective teacher—demands mental nurture through the careful study of the facts and principles of the sciences and the arts. Without such nurture, mental starvation and arrested mental development inevitably result.

In addition, in the interests of high scholarship and enthusiastic love of learning, I would suggest that every normal school student be required, in his senior year, to conduct a careful investigation in a narrow field—preferably in a non-professional subject—as in some part of history, literature, physical geography, geology, botany, etc., the results of which he should record in the form of a special report or thesis as one condition of graduation. As he has received, in accordance with preceding suggestions, a thorough high school education before entering the normal school, such a requirement would not be unreasonable or unduly severe. By means of this requirement, the normal school graduate would catch the scholarly spirit and be more likely to carry it with him into his work as a teacher. In matters of scholarship, the instructors in all normal schools should be more careful than some of them have been to avoid giving their pupils the notion that there is any stopping-place in the acquirement of knowledge and mental power. They should ever point the way to higher summits of

knowledge, and warmly encourage their students to push their attainments farther than is possible in the best normal school. Thus the graduates of normal schools would never justify the charge that they have the conceit of knowledge rather than knowledge itself.

"Mature minds can be left largely to self-direction; but the young are dependent upon the art and skill of those who instruct them."\* For this reason, the careful study of professional subjects and actual practice in teaching under skilful direction and critical supervision form an essential part of the curriculum of every state normal school. The scientific study of psychology—rational and physiological—with special reference to the problems of education; scientific and practical ethics; physiology and hygiene; the principles of social and economic science; the sympathetic study of children; the history and theory of education; school economy and management,—such are the most important professional studies for normal school students. The more practical side of their professional work should be taught by the requirement of written preparation of lessons to be given, by actual practice upon their classmates for a short time, by observation and careful analysis of expert teaching in a model school, and by at least a half year's experience in teaching in a practice-school—preferably a regular public school—under critic teachers, and for a time alone.

State normal schools will not, however, accomplish their greatest usefulness until in all states they are set in

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\*Chancellor W. H. Payne: "Contributions to the Science of Education," page 287.

organic and proper relations with other parts of the public system and their graduates placed by law in proper relations to the profession of teaching. In America, certainly in New England, the interests of education have suffered much from the tenacity with which our people have held to the principle of local initiative and self-government. In many matters, it works well; but not so well in school affairs. By reason of it, we often sacrifice important practical results for the sake of a theory. In all parts of our public school system, we greatly need to centralize our power and delegate it to experts to serve, after a period of probation, during good behavior. No person should be allowed to teach without a license, and the granting of licenses should be exclusively in the hands of the profession. No person holding a license to teach, moreover, should receive an appointment except upon the nomination of an official of the profession. There are several good ways to organize a state system of education, only one of which I will briefly describe: Vest large powers in a state board of education, to consist of a state superintendent of public instruction to be appointed by the governor of the commonwealth, who shall serve for a period of not less than five years, and *ex-officio* the presidents of the state university (or if there be none, then the president of the leading college or university in the state) and of the state agricultural college, and the principals of the state normal schools. Give to this board the power to appoint a financial agent for each of the state educational institutions, and the power to keep in its own control the educational policy and direction of each. In addition, grant to it the sole power of fixing the standards of admission to and con-

tinuance of all persons in the profession of teaching in the public schools, by a system of state, city, and county examinations for teachers' certificates. Let them make the diploma of the state normal schools a license to teach in the public schools of given grades for a limited time on probation. If, at the end of the specified time, the normal school graduate be approved by the state board or their agents, let his diploma be made a life certificate to teach in given grades of schools in the commonwealth. Let no superintendent of schools be employed who does not hold a certificate of qualification from the state board of education; and give to every superintendent of schools the exclusive right by law to nominate on consultation with his school principals all the teachers of his schools, and the power also of discharging them for cause. Thus state normal schools might, in the hands of able men and women, become a great educational power in the state; and, in incompetent hands, I cannot see how the situation can scarcely be worse than it now is.

I have spoken thus far of the preparation of teachers for elementary schools; but we sadly need better school superintendents and better teachers in secondary schools, normal schools, and colleges. Many college professors seriously lack skill in presentation and the power to arouse and maintain the interest and enforce the intellectual fidelity of their students. I do not expect adequate results in these directions, however, from normal schools—even higher normal schools, or normal colleges. To give dignity to the profession of teaching by the conditions of high scholarship and other similar connections of the learned professions, and thus attract to

it men of talent who will make it their life-work, we must have special schools of pedagogy, admission to which must ultimately require from all candidates the bachelor's degree from a reputable college. Such schools must be organized as other professional schools, provided with full corps of special instructors, equipped with professional libraries and laboratories, and, above all, furnished with excellent model and practice schools of secondary grade. As other professional schools separated from universities have never succeeded in maintaining high standards, and have never truly flourished, so schools of pedagogy must be connected in all cases with universities of undoubted reputation. Thus and thus only can the atmosphere of sound scholarship, of science, of liberal learning, be permanently secured in a higher training-school for teachers, and the vocation of teaching be permanently raised to a dignity equal to that of the traditional professions.

When all our superintendents of schools, high and normal school principals and instructors, and our college professors shall have been trained in such professional schools—and this vision of better things has already begun to appear in reality in several states—then shall our education be truly excellent, and the permanence of our civilization be assured.

### III.

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## THE PHYSICAL CONDITIONS OF SCHOOL LIFE.

### School Architecture.

BY HENRY W. HARTWELL, ARCHITECT, BOSTON, MASS.

Your President has paid me the compliment of asking me to address you upon the subject of School Architecture.

Unfortunately, perhaps, oratory is not as yet considered to be part of an architect's training.

If I can say something of interest, possibly of profit, it is all I may hope, or you expect.

From the Little Red School House by the country road to the High School building of to-day the way is strewn with wrecks, with buildings badly planned and ill constructed; with others showing great improvement but yet only half successful; and finally, with some fair examples of what a school building may be when honest effort has at last cleared the problem of all elements foreign to it and found what for the time and under the given conditions must be accepted as the true answer.

The little roadside building consisted of a single room. In the middle of one of its sides stood the teacher's desk. Opposite to this the open fire-place, huge in proportion

to the size of the room and burning great logs of wood, with varying and not wholly satisfactory results in the matter of heating, but securing ventilation of the most positive kind.

Between the chimney and the desk or throne of the teacher, was a certain open space of floor where the classes stood to recite, and where was fought out many a battle of the brain or of the birch, the scholars not immediately concerned sitting as spectators of the conflict, ranged line above line on either hand in the seats which rose one above and behind the other, for no good reason seemingly, unless it were that the occupants might the better watch the sometime rather uncertain struggle in the arena below. This room was lighted through windows somewhat high in the wall, usually upon three sides, over the heads of the scholars; and to the right and left of the teacher's desk.

Considered from the physical standpoint, and it is only with this that I have to deal, the building for the time, for the work to be done and for the local conditions, could hardly have been bettered. Every requirement was met: if in a somewhat rude, yet in the simplest and most straightforward way. Plumbing and sewer gas were unknown. All went well until that fatal day, certain to come sooner or later, when it was discovered or began to be suspected, that of the vast quantity of fuel which came in at the door to be passed out into the sky through the chimney in smoke, by far the greater part was wasted. Considerations of economy in this respect, then, for the first time, came to the front.

If the term "Units of heat" was not then in the mouth of the Committee man, he *had it in his mind* that some-

thing was wrong, that a waste was going on that must be stopped. There were Committee meetings: a visit to Boston or the nearest city, resulting in the purchase of something in which the fuel of the day could, as was claimed and fondly believed, be burned absolutely without waste. It was brought home in triumph. The great fire place was bricked up, or closed with a sheet of iron with a hole only large enough for the funnel of the cast iron monster, the "air-tight" stove which had been enthroned and which was indeed to save a portion of the fuel, but at what cost who shall say? The great open fire place had disappeared, and with it went many a rosy cheek, with it went that superabundant life and love for study which would not be satisfied with the day's work, but must have the spelling match, the Arithmetic class, and the debating club with which to fill the evenings of the all too short "winter term."

With the fire place went the little red school house as an ideal. The stove was a demon in whose train came untold evils of ill health and misery with which one entire generation has struggled ineffectually, almost up to the present time. But at last the victory over these has been won. It is no longer a question whether air can be supplied to every one of a given number of pupils, together with his or her share of the light of heaven, but whether it shall be done. Fortunately, in some states the law is coming to the rescue. Massachusetts to-day says, "It shall."

To-day one does not hesitate to bring together any desired number of scholars, knowing that each of them may receive his or her full share of those natural elements that go to the support of life and health.

A building recently planned for one of our New England cities will accommodate, under one roof, not less than 1,000 pupils: each room in this is to be properly lighted and supplied with a definite amount of fresh and properly warmed air.

The subject of ventilation is to be treated by the gentleman who will follow me. I have only to say in this connection that the successful operation in this respect of the building I have mentioned will involve the reception and the removal of not less than 50,000 cubic feet of air each minute of the school session. The magnitude of this work can be better realized by thinking of this quantity of air as a mass about equal in dimensions to the hall we are now in, this to be taken, perforce, from without the building at a temperature often below zero, to be warmed, tempered, distributed evenly, and without perceptible draught, throughout the building, while at the same time an equal amount is being discharged, exhausted of much of its virtue and loaded with impurities, into the atmosphere high above the top of the building.

The little roadside school house of the single room was the pioneer, and did pioneer's work. Like other pioneers, it has passed on, and its place is filled and its work done by others, under a system starting with the kindergarten, and ending, for the public scholar, in the thoroughly organized high school of to-day.

While each of these, the kindergarten, the primary, the intermediate, the grammar and the high school, has its own special requirements, there are certain things common to all. These are light, air, convenience and general comfort and utility. But before the building is

the site. This should be at once central and retired, quiet and free from annoyance, yet not too far from the public street, with its electric car or other line of public conveyance. While not upon a hill top, it should, if possible, be upon rising ground, for the purpose of free drainage, open to the sun and to a free circulation of air.

That our important educational structures should stand prominently in the public eye may be well, but this should not be accomplished at the sacrifice of any single thing necessary to their perfect equipment for the serious and important work for which alone they are built. This does not mean that a fine, open site is to be spurned because of its prominence, provided it better than any other meets the special requirements of the case. It is then to be accepted gratefully, but with a sense of added responsibility, lest, in the first place, we waste upon the exterior money that should be saved for more serious needs, and finally, let our financial limit be what it may, lest having set ourselves to build something that, whether we would or not, must long stand as a monument of the time and a record of its intelligence, we fail in any way to go forward in the spirit of sincerity, meeting the simplest question frankly and so framing our answer, whether this be in stone, brick, or more humble wood, yet in perfect honesty and truth.

The site having been fixed upon, the next question is of the exact location of the building upon the site. This is not to be determined alone or chiefly by the direction of surrounding or neighboring streets, but by the *aspect* of the important rooms. No lot of land is suitable for the purpose that does not admit of this.

To-day the almost unanimous verdict of those having experience in such matters is in favor of a southern exposure for rooms occupied for purposes of study. Not all rooms of a large building can open to the south, but such as cannot may look to east or west, and thus secure their daily *bath* of sunlight.

A site which will not admit of this adjustment of the building should be accepted only as a last resort. I said the "almost unanimous" verdict favors the sunlight theory. As always, there is a small minority who take the opposite view, and would open their class rooms to the north, where the light, if cold, is clear and steady. They say, truthfully, that with the appliances of the present day, any room can be warmed and made physically comfortable, and that, while sunlight is pleasant, the shifting lights of a day of drifting clouds and a brilliant sun are not only unpleasant, but trying and injurious to eyesight.

If these gentlemen are right, their theory will in time be accepted. We have then but to turn our school house around, bringing our class rooms to the north, and our corridors, staircases and special rooms to the south. Experience seems to show that upon either theory no better general arrangement can be made for a school building of moderate size than that which places the class rooms in line, running east and west, with windows, let us say, opening to the south, with some east or west light in the end rooms, and an ample corridor upon the north, opening southward into each class room, and elsewhere into the recitation rooms, teachers' rooms, emergency rooms, and all the various accessories of the building, according to its grade and scale of importance.

Doors of entrance open to the corridor from the east and west, and within stairs lead to stories above and below. Should the scale of the building be large enough to demand it, there may also be a central entrance from the south, or from the north, should the approach be from that direction.

In this building the corner class rooms being lighted from the front and from one side may be nearly square, while those lying along the front and lighted only from one side, must be narrower, but of any desired length. It is worse than useless to dogmatize and to fix absolute dimensions which shall serve under varying conditions. What will serve in one case will fail wholly or in part upon a different site and amid other surroundings.

It is doubtful if, for buildings of moderate size, the general scheme of rooms and corridors just described can be improved upon, but details must vary in every instance. Special requirements arise with each new building, with every fresh location, with every new Committee. Why one group of gentlemen *will* have the wardrobes at the entrance to the class rooms and all of the toilet rooms in the basement, while under similar conditions others demand that each story have its full quota of toilets, and all of the wardrobes go to the basement, is a question very difficult to answer.

These are not matters to be settled by fancy or prejudice ; the location of wardrobes within the building is often determined by the dimensions of the site and its immediate surroundings, the former of which limit the building and force things out of position, while the latter through their influence upon the light, force us to accept for the class rooms locations and dimensions we would

not otherwise adopt. Wardrobes have sometimes been forced even to the basement in order to leave sufficient space for the purposes of the school upon the floors above. This arrangement, in order to be even moderately satisfactory, involves a separate locker for each scholar, with special key or combination lock, and endless trouble through loss of keys or of combinations, nor does the trouble always end here. Such a plan should never be adopted for any grade below that of the High School, and then with reluctance.

In schools of the lower grades, no location is so good as one immediately connected with the class room. Each pupil is then easily under the eye of the teacher. With this exception (that of the younger pupils) provision for hanging of clothing may well be made at any convenient point or points upon each floor of the building, for the scholars located in the class rooms upon that floor.

An arrangement by which these are grouped in fairly large rooms, few in number, somewhat to one side, well lighted and ventilated, is to be preferred to any plan which makes of the coat room a vestibule to the class room, particularly in the case of the High School, but even this should be freely accepted if by reason of limitations of site, financial or other considerations, the result is otherwise a better working school building.

The location of *toilet rooms* is not, it seems to me, much in question. There should be sufficient of this kind of accommodation upon each floor of any school building to serve the convenience of teachers, and to provide against exigencies of the working hours. But the larger number of closets should be in the basement,

convenient to the play rooms, and easily accessible from without, their chief use being at recess or in other intervals of work. Water for drinking purposes should be on each floor.

For Kindergarten work but little is required beyond a few open, sunny rooms, easy of access and with a share of those accessories always needed for personal comfort. If possible none of these should be below the first nor above the second story.

For the Primary, Intermediate and Grammar grades, requirements are much alike, nearly all work being done in the class rooms. In Grammar schools we sometimes have to provide special rooms for teaching of sewing and of cooking. One large room, or a small hall, sufficient for the gathering of the pupils all together, at one time, is even in these grades desirable. This is not always demanded, nor sometimes even admitted, but it should, it seems to me, be had if possible; if for no other reason, in order that young pupils may, from time to time, come together, look in each other's eyes and realize that their school world is something larger than that fraction of it contained within the class room. It is well to foster loyalty.

Passing to the consideration of the High School, we find ourselves dealing with important additional requirements. The hall of assembly becomes a necessity. Beside the class rooms are recitation rooms in addition to the usual toilet rooms, and often emergency rooms, or small apartments for use in case of sudden illness: these are fitted with a lounge or reclining chairs. A High School building in a large town usually consists of three full stories and a basement, the latter containing exercise

rooms: sometimes space for military drill: often rooms for manual training, sometimes a gymnasium, and to-day, quite generally, (the latest features that have come into use,) the lunch counter and lunch room and rooms for bicycle storage. I have already said that this is also, in my opinion, the proper place for assembling in two separate groups the most of the W. C's, and in those very rare instances where bathing facilities are thought desirable and can be afforded, they properly belong here.

In addition to the foregoing, the basement has also usually to contain the boilers and other parts of the heating apparatus. This is not well. Whenever possible, boilers should be set in a separate building at a distance from the school, and upon slightly lower ground. There should be special doors of exit from the basement to the grounds outside, for use under such restrictions as the principal may determine.

Passing from the basement (which we have seen to be a very important part of the building) we reach the first and then the second floor above. Here are placed most of the class and some of the recitation rooms, the number of the latter, in proportion to the class rooms, being variable. In one large building we were instructed to provide but two, in another with 18 class rooms, 16 recitation rooms were required.

The first story is usually selected as the proper location for the principal's private room, from which the work of the whole school is directed, where the program clock is, and from which, (if the teachers' lines have fallen in pleasant places) also radiate telephones to all other apartments within the building.

The principal's room should be near enough to the

main entrance for convenience, but sufficiently removed for quiet. A reception room may well occupy the intermediate space, while not far away may be retiring rooms for teachers.

An office is sometimes demanded for the Superintendent of Schools and even for the School Committee, but this is at least a questionable practice. It may work well in some cases, but much must depend upon the personal characteristics of the officers.

The High School Library is an important feature and growing more important year by year. It may well be placed upon the second floor. A central location upon the north side is well chosen for this purpose, provided the working plan of the story has not to be forced in order to obtain it. If so, it may go in any other quiet, well lighted spot. The third story of a modern High School building is usually devoted to the laboratories, chemical, physical and botanical, with one or more lecture rooms, each with the aspect required for its special work, also chemical or other store rooms, with fire proof lift running from the basement. A large drawing room, lighted if possible from the north, and the general assembly hall with platform or stage and at least two ante rooms; these last to be convenient of access by a special staircase.

One of the chief difficulties of a large High School problem is to so place the assembly hall that it shall neither interfere, more or less seriously with the lighting of other portions of the building, nor cause waste nor ill-lighted spaces underneath the hall, if this be above the level of the first floor. A very large building, one to accommodate 1,000 or more, may be arranged around a court

yard, which, being covered with a roof of proper form, makes a very good assembly hall, level with the first or entrance story.

If in a wing or projecting portion of the building, the hall may be upon the second or upon the third floor, being in the latter case carried up into the roof and finished with an arched, timbered or panelled ceiling. Or, it may happen that the plan may take the form of the letter H, the hall forming the bar of that letter. In this case it would usually be placed above the second story in order that free communication between all parts of this, as well as of the first story, may not be interrupted. In the third story this is of less consequence, the laboratories, drawing rooms and special apartments which are here located not requiring frequent inter-communication, and being separately reached in each case by two of the four large staircases.

There is not time, were it otherwise desirable, to speak at length of other school buildings—the Normal schools, the schools devoted to art or to mechanics, nor even the Mechanic Arts High School, where your president is just now solving a problem upon the proper solution of which so much depends. Each of these buildings has its own requirements, location and surroundings, and must be studied by itself. Much that is here said of other buildings will apply with equal force to these.

It now remains to consider a few matters of detail which are of general application.

First, the all important matter of light. How shall we best obtain and control this? Many theories have been set forth which were expected to determine the exact amount of window surface in proportion to the

floor area or to the cubic contents of any given room. In practice all these theories fail, and we are thrown back upon experience and common sense. The only rule that will work under all conditions is this: Be sure that you have ample light for your worst rooms, under their worst conditions; there will then be enough for all. A moment's thought will show the lamentable result (architecturally) which must follow the rigid application of an exact theory of lighting, were such a theory otherwise workable. Imagine the principal front of an otherwise fine school building, with a varied assortment of windows scattered over it, many or few, small or large, bearing no relation to each other, but cut through the wall anywhere, *at the demand of a theory*, wholly regardless of the reasonable requirements of architecture as an art, or of construction as a science. A well known writer upon factory construction, in a leaflet recently printed, advises the use of a certain ribbed glass, this having been found to diffuse light successfully and throw it into remote corners of the room. No one will question his statement as to the value of this material in buildings for manufacturing purposes,—(it is said that in one case the operatives demanded its removal that they might see the sky),—but we do not make scholars as we manufacture cloth. Let us make our class rooms of reasonable width, so that the light shall penetrate to every part thereof, then let us open our windows—and our souls—wide to the light of heaven. When it proves to be more than we can bear, or than at the moment we have use for, there are many means by which it can be reduced or wholly excluded. Shades—running preferably from the bottom, leaving the high light to the last—

Venetian blinds, coiled shutters. There are plenty of devices for shutting out light. But in providing for the reception of it, in the first place, let us remember to make our windows *high*, with the tops level, not more than 6 or 8 inches from the ceiling, just enough to permit of proper construction and simple finishing. There is seldom occasion, and rarely good excuse, for arching the tops of window openings in a school room. In some of the larger apartments,—the assembly hall, for example,—or some other rooms higher than the rest, this may be done, but not in the rooms devoted to the real work of the school.

As showing how little thought is sometimes given to this all important matter, I will mention, without naming it, an expensive high school building, just now being finished, not far from Boston, the plan of which was the result of long and anxious deliberation upon the part of the committee. Finding myself near it one day in June, and knowing the builder, I accepted his invitation to enter and look it over. (One never neglects such opportunities, if he be wise.) Passing in due time through various apartments, we came presently to the room in the third story devoted to drawing. It was a corner room, with windows upon two sides, through one of which the sun was blazing hotly. It was a fine, lofty room, with perhaps a high light upon the remaining side. But what did we see? Only a group of rather small arched windows, insufficient for any ordinary class room, and set in this, a room demanding all the light out of the north, the higher the more valuable, *how?* The tops of these windows were more than four feet below the ceiling. The highest and by far the most valuable light was all shut

out and wasted. It is hardly too much to say that the persons responsible for this are guilty of a breach of trust.

The widths of corridors and staircases are properly fixed by the number of persons to be accommodated ; and no building whether small or large should be without two or more complete avenues of escape, the staircases being so placed and connections between rooms so arranged that free exit may be had from all rooms by either staircases in case of fire or alarm in the neighborhood of the other.

Light fly doors set across the corridors at some point between the staircases are sometimes advised to prevent the spread of smoke through the building ; they are however, objectionable for other reasons, and not often adopted. Where the extra cost can be afforded it is well to have iron stairs with treads of wood, asphalt or rubber, but if these cannot be had, the stairs as well as the wooden floors, and the combustible partitions should be thoroughly fire stopped. By this means, at trifling cost, fire may be prevented from spreading quickly throughout the building. It must then eat its way slowly giving ample time for the quiet removal, not only of pupils and teachers, but of books and apparatus.

Something has been said of the special value of so-called "Mill-construction" for school purposes, as being cheaper and less liable to destruction by fire. A careful examination of the subject in detail will show that for school buildings of equal quality "Mill-construction" is somewhat more (rather than any less) expensive, while as to its value as a fire resistant, it is only necessary to remember that two of the most destructive fires,

which have recently visited Boston had their origin in "Mill-constructed" buildings.

Many of us whose early work was done with a fragment of native chalk, often hard and gritty, upon a painted board, literally, a "blackboard," may look with envy upon the black-boards (the word has come down) of natural slate in use today. There is nothing better for its purpose than the best black slate, of even quality and texture, without filling, stain or any artificial treatment. These should be firmly set with the edges rubbed smooth and cemented firmly together with a simple wooden trough at the bottom to receive the "School Crayon," the successor of the chalk of former days. Various suggestions have been made as to the proper position of the slate, some claiming that it should be pitched slightly forward, others that it should slope backward. It is doubtful if either position is an improvement upon the vertical. It is well that this slate surface be carried quite around the room, even filling the narrow spaces between the windows. The eye demands that a band of color strong as this should not be arrested and suddenly broken off. The narrow panels not needed for the regular work of the class may be made to bear drawings or legends, such as may well be retained for a time.

I was announced to speak upon the subject of "School Architecture." It may seem to some of you that Architecture as such, has received but scant consideration. In one sense that is true, in another and broader meaning it is not so.

Fergusson, (Introduction to History of Architecture) seeking for a simple, fundamental definition of archi-

ecture as distinguished from mere building concludes that "architecture is nothing more or less than the art of ornamental and ornamented construction." This may seem somewhat radical, but its truth can hardly be denied. Nothing can be good architecture that is not at the same time good construction, and I may add that nothing can be good architecture that does not result directly from a good plan. Our building, if it is to afford lasting satisfaction must grow from within outward. It must be one that to the intelligent observer expresses with reasonable clearness its purpose and that cannot be seriously misunderstood.

A building, as to which one may, from its external appearance, doubt whether it was intended for a church or a club-house, a school or a hospital or even a factory (and there are many such), can have no standing with us today. It may be of any style, historic or prophetic, but it must state its purpose, must tell its story.

In its relation to matters pertaining to building, no other climate is one-half so trying as our New England climate. This fact alone excludes from reasonable use some styles of architecture otherwise attractive, and seriously limits our choice in this respect. Still there need be no fear of lack of variety, each new problem has its own special conditions. Let us meet these fairly with such skill as we may. Our building will then tell its story. Let it be refined in detail, restrained in ornamentation, whatever the style, but above all things *honest, above all things true.*

**Ventilation of School Buildings.**

By S. H. WOODBRIDGE, PROFESSOR OF HEATING AND VENTILATION, MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

It is my purpose to invite your attention to-day, with such brevity as is consistent with clearness and force, to three topics from among the many upon which it would be possible and proper to speak under the subject assigned to me.

First, the relation of air to vital energy.

Second, the cost of air supplied for the maintenance of that energy at its best.

Third, upon some simple methods in the nature of expedients rather than elaborated systems, by which air may be given admission to school rooms and made to move through them in effective ventilating work.

First, then, as to air and its part in the production and maintenance of human vitality.

Life is a flame, not in poetry and metaphor alone, but essentially in fact. Physical energy, so far as we know anything about it, is in the last analysis the product of chemical action. With the satisfaction of chemical affinities, energy locked up in potential form in atoms and in molecules leaps into active and kinetic forms, like the breaking forth of waiting strength into the song and dance and prowess of exulting activity.

Energy : who shall completely say what or whence it is? Who shall trace its hidden path back to its source, or analyze and fathom it from its beginning, down through its ever changing forms, until it thrills in our beings, or is pliant to our purposes?

Whence this strength in our human frames ; this indi-

vidual and this humanity's aggregate possession of energy and its capacity to direct its play? Whence also that energy not within us, nor a part of us, but without us, and yet so within our reach and use that through it we have come to the marvellous results which to-day fill us with wonder and thrill us with expectant awe as we wait for to-morrow's achievement?

And yet how puny is our combined strength compared with the forces that lie about us responsive to our touch. The might that propels the great steamer on the seas, or which brought you here by a power and swiftness of locomotion that dwarfs your own bodily strength to infinitesimalism, whence and what is it?

Mt. Washington, that monarch of New England's hills, rests on this huge earth of ours as a grain of sand might lie on the gilded dome of Beacon's Hill. And yet not all the physical strength of humanity combined could lift a thousandth part of that mountain against the pull of gravity! But what is the pull of that mountain upon the great earth compared with the vast sum of all the mightier forces in silent work on this small earth alone! And what is earth in the great phalanx of the heavens and what its little play of energy compared with the infinite sweep of that celestial energy in the midst of which and as a part of which "we live, and move, and have our being!"

To the understanding mind and the reverent spirit the answer to our question, Whence the energy of our life and the energy at our disposal? is ready. To such the wonder and the glory of our civilization is not in the power of steam as a thing of man's device, nor in coal as a material whose marvelous uses man's ingenuity has

only in part discovered, but rather in this—that the Infinite energy, by placing itself in things material, has put itself within the reach and the use of humanity. It is the power of that Infinite energy, placed within human reach and at human disposal which urges on the great steamer and speeds the railway train. “The strength of the hills”—in their treasures of coal and of iron—“is His also,” and wherever we are borne, in our steamships or in our trains, it is by the store of His strength put within our reach, “that we move, as we also have our being.”

We do not, therefore, speak irreverently when we say that physical vitality is a chemical product. We rather declare the inspiring truth that the Infinite has lodged in things material His own might to be made ours by processes placed also at our command. We declare that vital force is imparted from the Infinite energy and through the way of His providing. We make chemistry the key which unlocks the energies stored in atoms and molecules. By such a conception we exalt our life, and we magnify the Infinite in that life.

It follows, then, because the processes of nature are exact and not loose, designed and not hap-hazard, that vitality can reach its best only by putting life into those exact relations with nature's order which have been established for it.

For the purpose of our study today we shall regard vital energy as a flame and the body as a furnace, with associated parts for the transformation of heat, or thermal energy, into dynamic or mechanical energy. The fire beneath the boiler imparts most of its thermal energy to the water, transforming the water by that energy into

elastic steam, and that steam gives over a part, a small part, of its energy so gotten to the piston of the engine, and thence it is transmitted through crank and wheel, and belt and shafting to the various and scattered points of its final application. The waste between the energy locked in the coal and that today made available in the product is enormous and at some future time will, perhaps be regarded as wickedly prodigal.

In the body the burning, or energy production, is more nearly at the point of power expenditure, and the process of transformation is so highly effective that in the human or animal machine a pound of fuel in food will produce much more effective energy than a pound of coal burned under a steam boiler.

There are three requisites to the obtaining of the best results from a boiler fire, the first in the order of importance being a good draft, the second good stoking, and the third, good coal.

The best coal will not burn without an adequate draft. The best stoking will not make a good fire with the best of coal without draft. With a strong draft coal will burn with poor stoking. Inferior coal, with a strong draft and good stoking, may make a hot fire. Of first importance, then, to *fire* is air ; second, stoking ; third, fuel quantity.

The same is true of the body's fires. The prerequisites to the most vigorous vitality are : first, abundance of pure air ; second, proper and sufficient exercise ; third, the best of food. In this case the air is the physical furnace's draft ; the exercise is the stoking ; the food is the fuel. And here also we find the same order or sequence, first in importance being air in adequate quantity and purity ; second, exercise ; and third, food quality.

Coarse and ill-adapted food, with an abundance of pure air and exercise, produce finer specimens of physical vigor than the best of food, with impoverished air for breathing, and without exercise. Compare the robust vitality of a coarsely fed and even poorly fed out-of-door laborer with that of the most pampered in diet, breathers of the confined air of luxurious apartments, occasional dainty exercisers in softly cushioned carriages, and our point is strikingly illustrated.

Without further argument it must be conceded that that to which is generally given least importance in our thoughts, as compared with the thought given to food and recreation, is really of the greatest importance to our best vitality. We think more of our eating than of our breathing, and more of the loss of a half day's recreation than of a whole week's deprivation of pure air. Municipalities will spend money by the million for parkways for the occasional outings of their citizens, and on spread-out beauty which gratifies their pride, the meanwhile condemning as wanton waste the spending of a quarter of such sums on the sanitation of schoolhouses in which the city's educators and children are breathing for thirty hours of every school week.

We some of us need a revolutionizing of ideas as to what our physical life is; first of all a chemical product, to which air is an essential element, and for the completeness of which air *must* be had in freshness and abundance.

What relation, then, has air quality and quantity to this product? In a study of this question we shall also find that the analogy between the material and the vital flame holds good. A candle flame, a lamp flame, a gas

flame is sensitive to the purity and quality of the air in which it burns. A candle which burns in pure air with a brilliancy of 100, drops to a brilliancy of 95 when burned in air not uncommonly found in the rooms of our schoolhouses. A change of 1-500 in the chemical make-up of the air produces a change of 1-20 in the luminosity of a candle flame ; or, in other words, the change in the candle flame due to atmospheric impoverishment is 25 times as great as the change in the air's chemical makeup.

The effect of atmospheric change on a flame's vitality is still more strikingly illustrated in flames which, though apparently more robust than the candle's, are yet dependent for such robustness on an exactment of adjustment in atmospheric conditions. If through the chimney of a student lamp burning two ounces of oil an hour there passes about one cubic foot of pure air a minute, the flame burns with its normal brilliancy and power. If, however, with that cubic foot of air 1-20 of a cubic foot of expired breath be mingled, note the results : first, in the slight chemical change in the air ; and second, in the vitality of the flame. The oxygen of the air by the admixture of that small quantity of exhaled breath has been reduced from 20.96 to 20.76 of the air volume. The change in oxygen proportions is about one per cent. The change with reference to the total volume of air is but 1-5 of one per cent. ; that is, the carbon dioxide has been increased from four parts in 10,000 to 24 parts in 10,000, a proportion sometimes though rarely found in our worst ventilated school rooms.

It is stated as a matter of record that in times of intense political excitement English audiences have re-

mained in crowded halls until the lamp flames have died out and left them in darkness, because of the insupportable quality of the air. We may therefore be prepared for the result of the slightly changed air quality on the sensitively organized, but, under normal conditions, most robust flame of a student lamp. You know the strong, brilliant, steady flame of the perfectly burning student lamp. Breathe through this small tube as slowly as possible into the air-flow which enters the lower part of the lamp's wick tube and note the result. The steady flame wavers and flickers and drops to a diminutive, sickly, pale blue flame, strongly suggestive of physical collapse.

Something of the same sort, though in far less degree, you must have noticed at times in the fluctuation of luminosity in the table lamp flame, due to the mingling of exhaled breath as it floats in streaks, now in this way and now in that, with the air passed through the lamp chimney. The brilliancy of the burning of illuminating gas in freely ventilated audience halls has been often noted and has been more generally ascribed to an improved quality of the *gas* than of the air in which it burns.

My point is sufficiently, though by no means exhaustively, illustrated—that point is this, that in nature's economy any change, however slight, in the conditions on which her processes are made to depend, results in changes in those processes themselves which are seemingly out of all proportion to the changes in the conditions which produced them. Nature's processes are exact; her adjustments are fine; her combinings, whether of atoms in the balance of chemical affinities, or of

worlds in the balance of celestial mechanics, are exact. The slightest deviation from the established order is followed by consequences marvelously changing the nature of results. The change of an atom in the proportions making up a compound changes the entire nature of the product.

If, then, we study physical vitality as a chemical product, we are prepared to appreciate the importance of maintaining its atmospheric factor at its normal in quantity and purity. And if we bring it into analogy with that to which, in chemistry, it is most closely allied—the flame—need we be surprised, should we not rather expect that *any* change in air which would affect the luminosity of an insensitive flame would also equally, if not more seriously, affect the glow and brilliancy of sensitive human vitality?

We have not here the time to marshal the long line of corroborative evidence from the fields of analogy, experiment, and experience. The weight of testimony from every quarter is overwhelming in support of the correctness of our premise.

## II.

We pass now to the second part of our subject, the cost of pure air. How much is it? Is it worth in money, its cost?

This cost may and must be measured in two ways; first, in money expenditure, or that in time and labor which it represents; second, by its return either in money or in the increased power of acquiring it; for money—honest money—is in the last analysis the measure of the quality and the quantity of labor.

It is to the low, the soulless, and mercenary side of our large question that we propose to apply ourselves for the moment, and yet, in a sense to its most important side. Men are yet so generally living on the level of the purse pocket that on that plane they must be honorably met and won. There are, indeed, those of us who are more effectively moved by considerations wholly apart from and vastly above the mercantile level

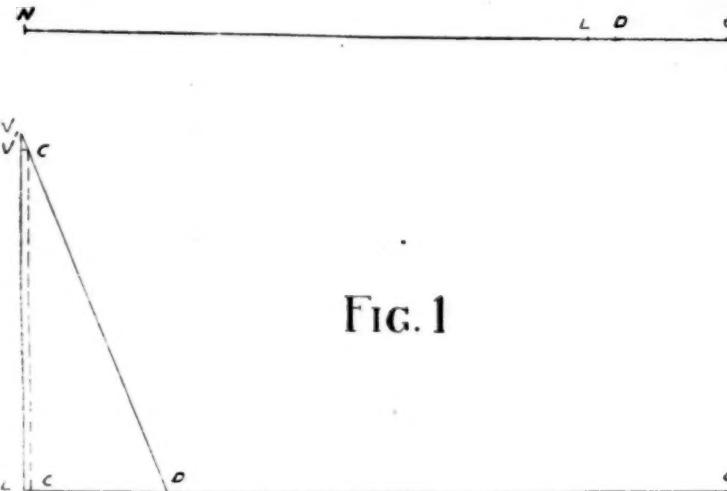


FIG. 1

to whom the value of the vigor of life and the robustness of perfect health are above comparison with gold, to say nothing of silver.

Before you is a diagram (Fig. 1) which by mathematical lines represents life's and vigor's decline, due to impure air, as we have just seen it illustrated by analogy with the candle flame. The horizontal line represents the constitution of normal air, NL the nitrogen, LO the oxygen, the lengths of these lines corresponding to the

normal proportions of these gases in the air. At L we find life at its best. It might not unnaturally be supposed that, as oxygen is the supporter of life, life's vigor must vary in some fixed ratio with the oxygen proportions in the air; that if life is at its best at L, it will be at its worst, that is, cease to be, when the oxygen wholly disappears from the air. But let L move only to D by the displacing of oxygen by carbon dioxide and life becomes impossible. The limits of life are therefore held not between the points L and O, but rather within the two points L (life) and D (death).

Representing these limits on a larger scale, and graphically showing the full 100 per cent. of life's vigor at L by the line LV, and at D the absence of life, we have represented by the line VD the decline of vitality with the impoverishment of air. Let the oxygen in the air be reduced by respiration from LO to CO, as it often is in some of our school buildings, then vitality drops to V'. What is the cost of such a drop? What is the worth of VV' preserved and not lost? It is the *crest*, the *cream* of life that is found at the top. That is lost, if *this* be lost. Its *keen edge* is gone.

If our estimate of the value of life is low, then the line LV is short and the gradient VD is small. If our value of life is large, then LV is high and the gradient VD is sharp, and the decline of V becomes of correspondingly large significance.

We have found that the impoverished air sometimes tolerated as tolerable in our school houses reduces the brilliancy of a candle flame five per cent. below normal. Some English students of sanitation have declared that the productive work of scholars in badly ventilated

buildings falls 25 per cent. below the work of those in well ventilated school rooms. A gain of something like 20 per cent. has been unofficially reported as one of the results of greatly improved sanitation made within the last ten years in the school buildings of Chicago. A badly housed and wretchedly ventilated department of a well-known scientific school, whose location, to spare its managers public mortification, must be unnamed, when moved into new, light, and airy quarters, is reported to have made a gain of from 15 to 20 per cent. in yearly work accomplished. The several divisions of the Pension Bureau of the United States Government were at one time located in as many detached and scattered buildings in Washington. They are now quartered in one large, roomy, well lighted, and well aired building. Under the old conditions about 18,000 days of labor per year were lost to the government through illness in the clerical force of that one department. Under the improved conditions now existing, and notwithstanding an increased force of employees, but about 10,000 days are lost through illness—a gain of 8,000 working days, or twenty-seven years, to say nothing of the corresponding increase in the working capacity of the entire clerical force.

Such records as these, and let me say it with emphasis, are of value because of their suggestiveness, rather than because of anything like their numerical exactness or arithmetical demonstration of fact. They indicate, like sign-boards, the roadways to robust health and its full product, and to debilitated powers and their costly results.

But let us, for the sake of a perfectly reasonable

standing ground, turn once more to the story of the candle burning in vitiated air as the more reliable witness to fact, and assume that its loss of five per cent. in luminosity may be safely regarded as indicative of the loss suffered by the vital flame as a result of bad air in school rooms. What, then, is the cost of that bad air? Five per cent. of a school year lost is one and one-half weeks of school work lost. If \$15 represents the annual per capita cost for educational work, the loss represented in money would be 75 cents per year per capita.

What, on the other hand, is the cost in fuel of a ventilation which would supply an abundance of pure air! One pound of coal well burned and its heat economically given to air, will warm 16,000 cubic feet of air from the average winter temperature of New England up to 70 degrees F. At a supply rate of 40 cubic feet per minute for each scholar, 16,000 cubic feet would be a per capita supply for seven hours. A school room's week of 25 hours would require 60,000 cubic feet of air per capita, at a cost in fuel of 3 3-4 pounds of coal. If 30 weeks represent the portion of the school year when air must be warmed for ventilating work—when closed windows and doors must shut out the waiting oceans of pure air, and when fresh air must be dribbled into school rooms through contracted, crooked, dark, and sometimes dusty ways, and urged through those ways under the spanking of a fan, or the torture of hot irons; and when, having done its silent ministry of mercy, it must be shown a way out scarcely more inviting or free than the way in—if 30 weeks represent the time when ventilation *must* be by such means, instead of by welcoming

open doors and wide open windows—then 112 1-2 pounds of coal is the necessary fuel cost. The money cost of 112 1-2 pounds of coal, at \$5.00 per ton, is 28 1-10 cents. It therefore appears that by spending less than 30 cents per year for fresh air 75 cents may be gained in school expenses and profit.

This estimated profit of 250 per cent. on the fuel investment I believe to be *lower* than experience has shown to be the money loss due to insufficient air, and that drop of five per cent. in the brilliancy of a candle flame is too short a measure for the corresponding loss of vitality in the far more sensitive vital flame.

Referring again to the official reports of the Pension Bureau, it is found that the total coal consumption for both heating and ventilation during the time when 27 years were saved to the Department was 700 tons, at a probable cost of \$2,800. Assuming the average pay of the Bureau's employees to be \$800 per year, and also that 30 per cent. of the coal burned represents the fuel cost for ventilation, we find the fuel cost of ventilation to be \$6.40 against a gain of \$22,400 in services rendered.

But the losses and gains are multiphased. They are by no means represented by the single item of time or its money equivalent. Lowered vitality, increased liability to disease, its greater severity when it comes, the cost of medical attendance, the apothecary's profit, the time of others given to the sick, all these and more are among the losses legitimately chargeable to the evils of a mistaken economy, practised on nothing so rigidly as on the freest and most needed of all things—*pure air*.

The time has come to stop the too common and ill-considered questioning about the cost of fresh air and

to press home upon our public servants whom we elect to govern us and to whom we entrust our interests—it is time to urge home upon them the criminal costliness of bad air.

It is for you and for me as public educators to make this truth known and to awaken the public mind to such a knowledge of these matters that effective insistence on the human inherent right to the great universal gift—pure air—shall speedily result.

It is the engineer's part to give himself to the most conscientious, studious, and fearless effort of reducing the science of heating and ventilation to its simplest terms; aiding the architect in the arrangement and construction of his building with reference to the simplicity, the effectiveness, and the economy of heating and ventilating work; protecting the public and the private client against the costly methods of hobbyists and the high priced blunders of rule-of-thumb contractors; and against the pit-falls of extravagance and quackery, and the knavery of professional sharks; and to train owners and users to an intelligent skill and economy in the use of apparatus. It is his function also to convict an apathetic public of criminality in robbing teachers and the taught of any fraction of their rightful vitality, and of stupid extravagance, either in denying fresh air to school-house tenants, or in appointing, as custodians of the public's black diamonds, men whose qualifications for such important services are often measured by irrelevant and dishonest standards.

The teacher's part in this great work of public hygiene is to insist on the obligation which compulsory attendance in public schools, or invited attendance on

private schools, carries with it to surround school room occupants with the best sanitary environment ; and also through the children to educate the parents to a proper sense of public duty as citizens ; and to train the scholars for such good, intelligent, and broad-minded citizenship that when they shall become the city fathers, or the town's selectmen, or the school committee men, a request for fresh air will not be received as an invitation to squander public money on an aerial fad.

### III.

There remains small time for the study of the third part of our subject, and I shall devote it to bringing to your notice suggestions with reference to methods of arrangement for ventilating work, which may be resorted to when expedients must be substituted for systems. It is the function of the engineer and the architect to give to you correctly and carefully wrought out systems, successfully worked into the anatomy of your buildings. It is your function to use what means you may have, or which may be available to you, whether the best or the worst, to the highest advantage.

It must be said at the outset that in this, as in everything else, good is to be gained only by sacrifice and that the pouring in of pure air can be had only by the pouring out of some money. But what is money for but to be effectively poured out? The sleeping dollars of hoarded earnings are as useless as the still water of a stagnant pond. Effective energy is found only in motion, in the current of the water, in the currency of the dollar. And so, once again, I find myself reverting in-

evitably to this first step essential to hygienic progress and appealing to you, educators, to turn the human mind from its sordid love of money, simply a labor equivalent, to a love of that best and most permanent of things money, or its equivalent, labor, can bring—*health* of body, mind, and spirit. Life is the thing of supreme moment. Everything else is of value only as it contributes to life. Put into the highwayman's murderous threat “Your money or your life!” a message of fundamental truth and philanthropic appeal and teach it inside and outside of your school rooms.

Ventilation may be had, and generally is had, by open windows. But by resorting to such means we are likely to run headlong into one danger in the effort to avoid another. We must take our course between the two. On one side is vitiated air, which, like a slow poison, saps our vitality; and on the other is the dagger-like draft. By the one we may die as by a slow fever; by the other as by a sword thrust.

The problem which I am going to ask you to study with me, then, is how, at small expense, to provide buildings having no adequate ventilating system with means which shall protect our vitality against both dangers and materially improve the air of school rooms.

For your encouragement let me for the first time give publicity to a bit of personal professional history. My course as a student at the Institute of Technology was chosen with reference to teaching in a favorite line of study—physics—in the hope of becoming some day a Hartwell, not in the inspiring field of noble architecture, nor in the broad and humane fields of public hygiene, but in the fascinating walks of high school physics, and

perhaps of climbing into a chair of physics in some college. That hope was blasted in the foul air of the Institute's physical lecture room, and since a certain critical day of Institute experience I have found myself swept onward by an uninvited and almost resistless current of events which has brought me up to this morning's privilege and pleasure of speaking before you.

The lecturer in that class room rarely came out of it without a sick headache and jaded strength. For ventilation purposes, large double windows were used in the best permissible manner, but the indraft was fatal when air quantity approached sufficiency. A request to be allowed to devise or to do something for the relief of the lecturer and the class was denied on the ground that thousands of dollars had been spent in vain attempts to provide proper ventilation for that building and that more could not be wasted.

For weeks I looked out of those large windows at the great floods of fresh air sweeping up to and beating against them and felt the sting of the cruelty that hindered them from fulfilling the errand of their mercy. I had something of the feeling toward that intervening and interfering glass that christendom has to-day toward the Turk, and I put myself into an active allegiance with that outside, life-giving, but excluded air.

My opportunity came, when, during a popular lecture, two of Boston's brave women, teachers I have always supposed, fell victims to that room's foul air, fainted, were carried out, and for want of any better place were laid out and restored on the marble floor of the lobby.

With that incident as a text I was given leave to intrude myself upon the authorities and to submit a plan

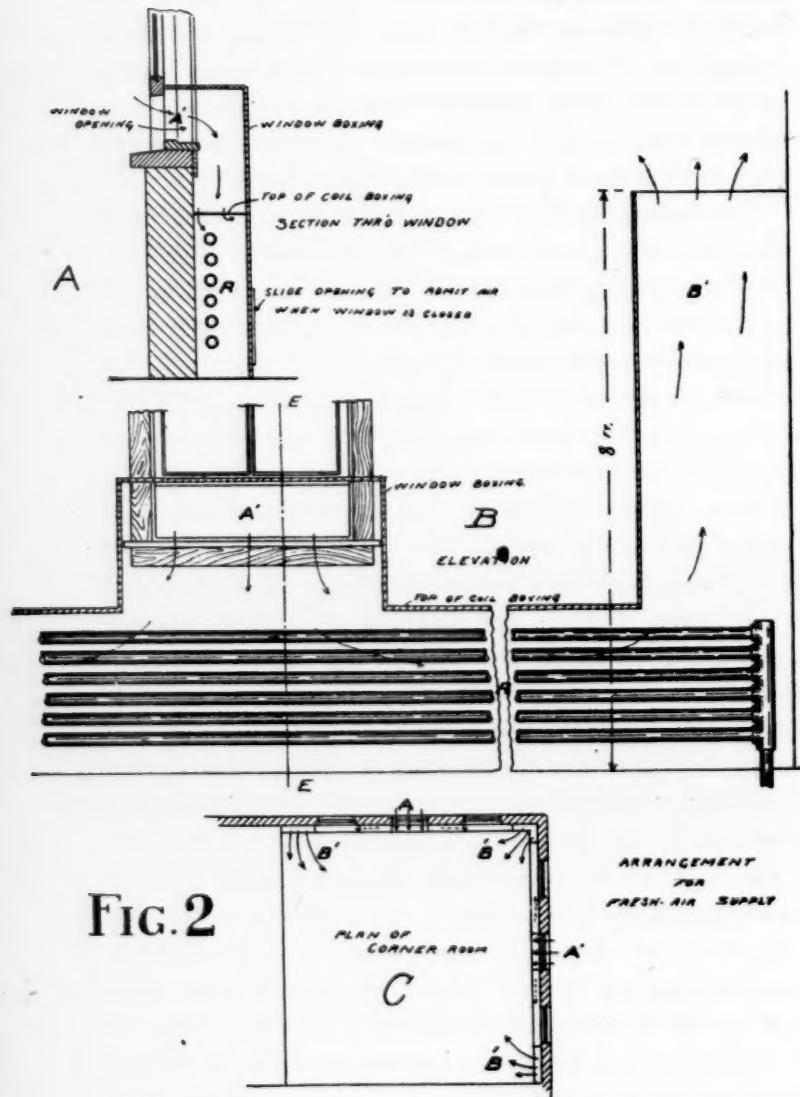


FIG. 2

for the room's relief and also a reliable estimate of the cost of its execution. I was well, even heartily received ; perhaps, because my plan involved the expenditure of but \$15. The order to proceed was given, and within one week's time that lecture room's air became a pleasure to its occupants. The plans were adopted in other rooms of the building and are in use, with such satisfactory results to the occupants to this day that nothing better has been asked for by them.

The simple device used is shown in the drawing (Fig. 2) and is a method applicable to many of our buildings, old and new, which are heated by steam coils run along the outside walls of the room. Fig. 2 consists of three parts, A showing a window with lower sash raised and box connection made with the air conduit which surrounds the steam pipes. A shows a cross section of the box on line EE in part 2d of the figure ; B shows an elevation of the same arrangement with inlet window open, the air moving both ways from the window over the steam coils to the uptakes, one of which is shown at B' ; part C of the figure shows the adaptation of such an arrangement to a school room, the intake windows being shown at A' A' and the uptake flues at B' B' B'.

If school rooms are warmed by radiators, instead of circulation coils, or by stoves, the air may be warmed by passage over them before its entry into the school room by methods shown in the drawings. (Figs. 3 and 4.)

Fig. 3 shows a method for passing outside air over a radiator and warming it and delivering it into a room in a manner to avoid drafts, steam being continuously upon the entire radiator, the temperature of the admitted air being controlled by a mixing damper D.

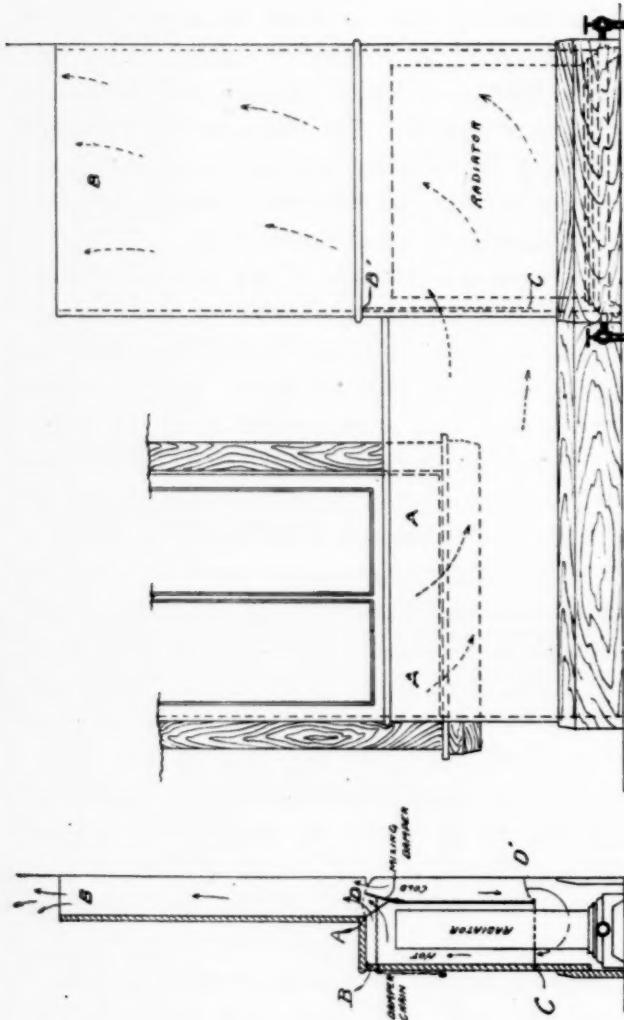


FIG. 3

NOTE: THE PLATE INDICATED BY A B C D IS A STOP TO THREW THE ENTERING COLD AIR BACK ARRANGEMENT FOR FRESH AIR OR RADIATOR

Fig. 4 shows a common type of stove for wood burning arranged for the same purpose. In this case the temperature of the inflowing air is controlled by the stove dampers.

When school rooms are furnace heated the air supply may be made much larger than is tolerable when the air passing through the registers must be first heated by contact with a furnace. The air supply moving through a furnace is reduced, first, because of the crooked and contracted course through which it must pass; and second, because that air, being made a vehicle for heat, must be controlled in the quantity of its flow by the heat quantity required in the school room. Ventilation by the furnace or allied methods of heating demands an adequate and continuous air flow and a regulation of the temperature of that flow according to requirement; or, in other words, constant air flow and variable temperature of supply. In practice we too commonly have at best an inadequate supply, and one which must be varied with the temperature of the supplied air.

The device to which your attention is now called (Fig. 5) is applicable to a furnace or any other form of indirect heater. It is an application of means for regulating the temperature of air flow without changing the quantity of that flow. For this purpose there is required a sufficient supply of cold and a like supply of warmed air, and suitable means for mixing them in needed proportions for the temperature of the room.

A method of effecting this is shown in the drawing before you (Fig. 5). The cold air box A is made large, at least five square feet of cross section for one school room. It delivers air to one chamber C at the bottom

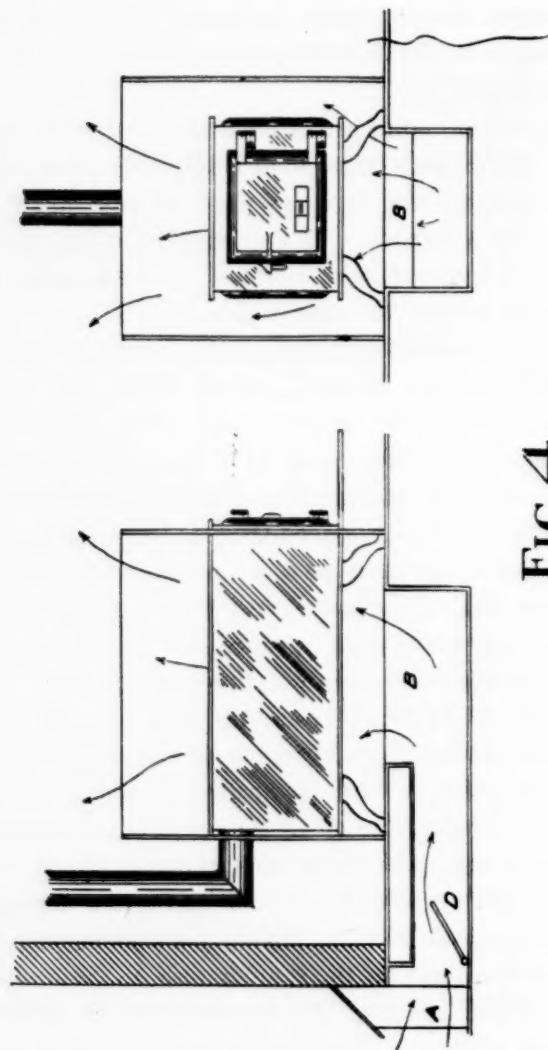


FIG. 4

of the furnace and to another C' at the top. That entering the bottom chamber rises about the furnace shell, and is heated; that entering the upper chamber is not warmed; each chamber has a properly proportioned connection with the supply pipes to the rooms. These pipes should have an aggregate area of not less than four square feet for the lower story. By means of

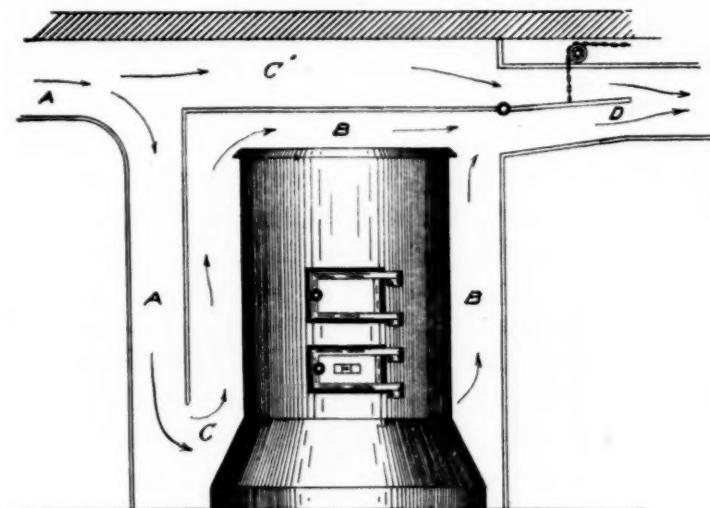


FIG. 5

valves operated by a chain and pulley connection from the school rooms the proportion of cold and hot air which shall mingle in the pipes may be controlled by the mixing damper D.

Fig. 6 shows a method of arranging an indirect steam surface for the same purpose. It illustrates a method frequently used for by-passing air about steam

or hot water indirect heaters and for controlling the temperature of air supplied through an uptake flue to rooms.

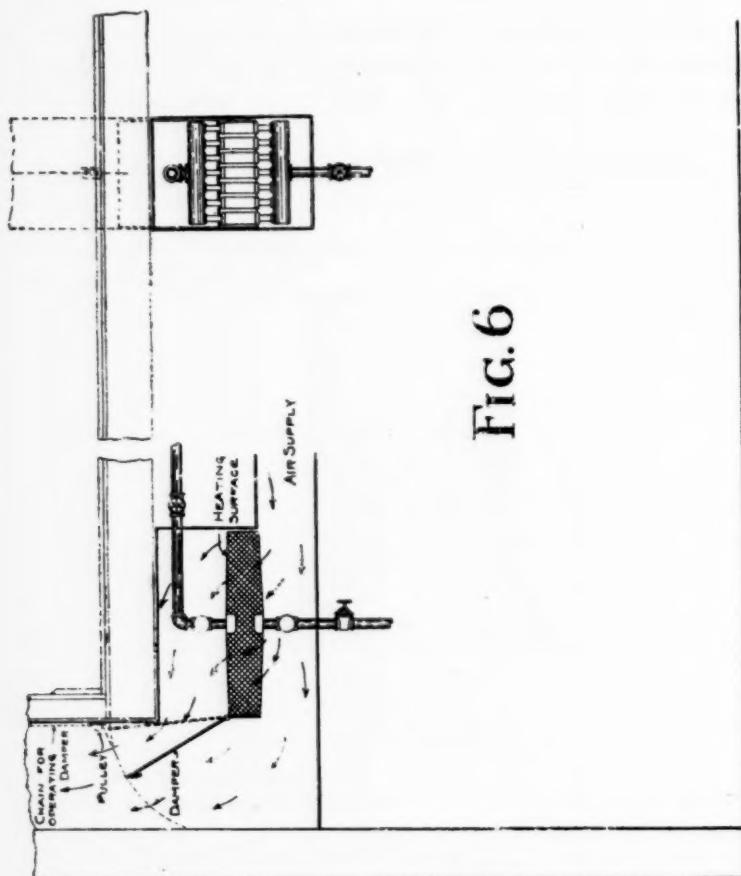


FIG. 6

All such methods, whether applied to stoves, furnaces, or steam coils, are of small value unless the airways are made of proper size for ventilating work.

Where such means as I have described prove inapplicable, either because of their expense or because the heating apparatus cannot be adapted to such work, it is possible to resort to other still more primitive and yet serviceable methods of relief. It is by the use of open windows, the air flowing through which shall be diffused through so large a surface as to prevent drafts, and shall at the same time be warmed by mingling with the warm air of the room before it can come within reach of the occupants. This method might be applied to school rooms by inserting frames in all the windows, they carrying or being covered by some open mesh fabric, like cheese cloth or thin muslin. The linear movement of air through such an extended surface would be slow, except under action of a strong wind, but the aggregate air quantity passed would be large. The objection to thus substituting cloth for glass in school room windows is evident. The darkening effect would be a serious obstacle to the use of such means, and the manipulating of the frames would be so troublesome as to result in their disuse.

Ordinary cheese cloth, when clean, offers an obstruction to air flow which reduces the rate of its movement through any given area to 1-7 of the flow through the same area when free. The large area of diffusing surfaces made necessary can be had without seriously obstructing windows by the method shown in the drawing (Fig. 7) and by the extension of that surface to two or three sides of the room, if necessary. Its position protects it from wetting and filling by rain and gives it the best opportunity for passing cold air in from the outside and for warming by mingling with the ceiling air, where the surplus of heat resides, before it can reach the floor.

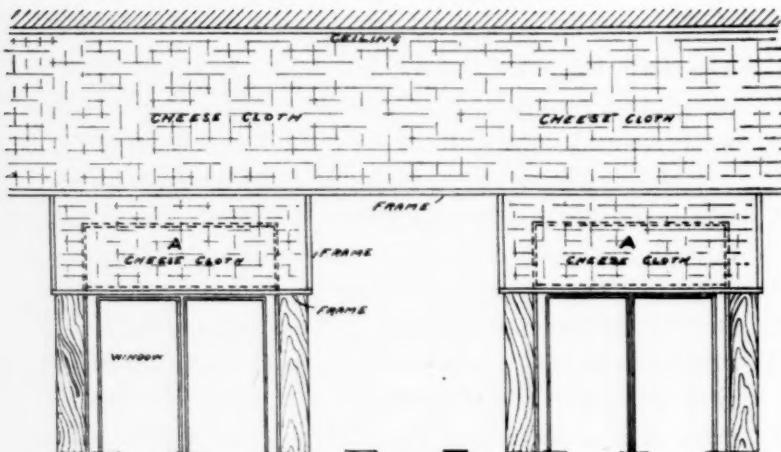
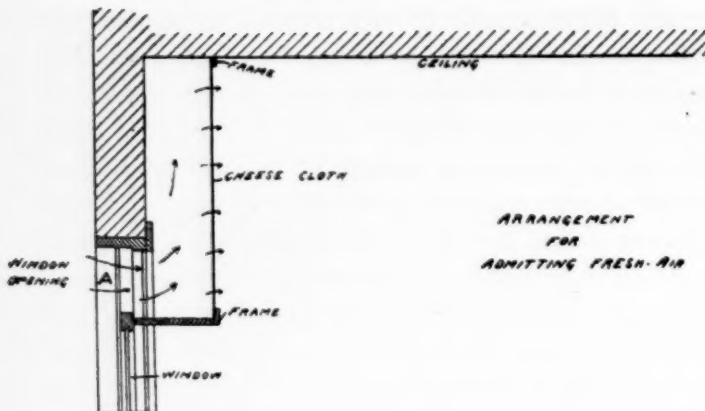


FIG. 7

For the discharge of air from rooms and buildings provision must also be made and methods must be modified to accord with circumstances. If there are and can be no exclusive and sufficient ways for the movement of air in its outward course, there may be given to it the right to share the use of hallways and stairways with those for whose service it is present and then be given final egress through a scuttle or more fitting outlet at the roof.

All this brief outlining of methods is designedly most elementary. This is neither the time nor place to enter into a discussion of the mechanics of ventilation, nor of the varied mechanisms for producing it, nor into the regions of disputation regarding results demanded and the means of effecting them. My effort in this part of my subject is to serve you by the suggestion of means within your nearer reach for freshening your own and your scholars' lives.

In the application of any such devices as those to which your attention has been so hastily called, three things should be clearly understood and continuously borne in mind.

First. The force which, without the aid of mechanical means induces fresh air to enter our buildings and to diffuse itself through them and to carry away atmospheric impurities from them is so inobtrusive and gentle that the spreading of a cobweb across its pathway through a flue may be enough to hold the air movement in complete check. Hence the necessity of providing means for ventilation in which nature's delicacy in forcing fresh air upon us shall be fittingly recognized. For, light and yielding and unstable as air is, it is steadfastly true to

the law of its being and cannot be coerced, nor cajoled, nor imposed upon.

Second. The force of wind—air in its frolic or its fury—is greater than that which nature brings to us in the gentle pressure available for ventilating work. It enters as a complex and complicating factor into such work as we are considering. We cannot disregard it, much less antagonize it, for it will upset all our doing and bring our ex parte schemes to confusion. We must rather make terms of alliance with it and shape our devices to its uses.

Third. All devices and arrangements for bettering ventilation which fall in any way short of producing results essential to good health must be regarded as expedients, to be resorted to only under the stress of necessity. There are two dangers always before us in the choice of means and of methods. One of being satisfied with mediocre results bolstered up by an active and deceptive imagination which complacently plays about the ocular evidence of good intention exhibited in ventilating systems; and second, the danger of indulged or imposed notions more costly in acquisition than valuable in possession or in use. Seek first of all efficiency, then simplicity, and with both economy.

Stand in reverent fear of those to whom the mysteries of ventilation have been revealed, and to whom alone the aerial secrets have been disclosed. Because ventilation concerns itself with the movement of the unseen, under the action of forces which are invisible, through paths which are trackless, and with the carriage of impurities which are ethereal, it will always be relegated by some to the regions of capricious art and the

realm of quackery; tendencies of thinking which impose themselves to-day upon some who court recognition as authorities in the theory and as experts in the practice of ventilation, and from which only the stronger and better trained minds are wholly free.

This, then, is my brief message to you. I trust that I have not misused the opportunity, nor abused the privilege you have so kindly given me. I shall go from you and from this place of refreshing and inspiration thankful if I may have spoken a word which may help any of you to make the thoughts of some men broader, or the air of some school rooms freer and fresher, or your "blow for life" stronger and surer.

NOTE. For the use of the cuts which have been employed to illustrate the foregoing article, acknowledgment is due to the courtesy of Mr. C. Wadsworth, of *Heating and Ventilation*, New York City.

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### Interior Decoration of School Houses.

BY WALTER GILMAN PAGE, ARTIST, BOSTON, MASS.

In a report of the Committee on Drawing of the Boston School Board, for the year 1883, reference is made to the desirability of forming an "Art for Schools Association," based upon the ideas presented in a French report to the Minister of Public Instruction, in 1881, by a committee formed for the decoration of school houses, and similar to an English institution, organized in London, with John Ruskin as president, Matthew Arnold, Lord Leighton, and other eminent men as vice-presidents.

The report of the Committee on Drawing proceeds to

state that, "although we cannot ask the co-operation of the School Board in our proposed effort to found an "Art for Schools Association" in Boston, yet we believe that the decoration of school house walls with good prints and photographs will bring good influences to bear upon the pupils, and also that they will materially aid teachers of drawing, history, geography and natural history, as objects of reference."

This report, from which I have quoted, was written by Charles C. Perkins, Chairman of the Committee on Drawing, and more than ten years after the decoration of the hall of the girls' high school, the most notable and complete illustration of school decoration at that time, and just ten years before the actual formation of any organization such as the report refers to, for it was in May, 1893, that the Public School Art League came into existence, which, though short-lived, did not die before having caused and given impetus to what may be called a great forward movement in the work it represented.

Before the League began its career very little important work had been accomplished, but such is not the fact to-day, though even now we are but entering upon a field of broad dimensions.

While, therefore, this subject of the interior decoration of school houses may be termed a live topic, and while efforts in this direction are being made by associations and individuals, the number and the interest increasing with each year, yet I feel that the matter requires careful study, for it means something more than collecting funds, buying pictures and casts, and placing them upon the walls of the school room. It seems to

me that this is not giving the subject all the consideration that it deserves and requires, and that is necessary for its proper development.

While it is reasonable to suppose that an artist is the best person to consult in a matter of this kind, and though it is not my intention to reflect in any way upon my own profession, yet I know positively from experience that, while artists may be consulted on questions of art alone, yet it is essential, in planning for the decorations of a class room, to be conversant with its practical conditions.

I think it is pretty generally conceded that to decorate a school room is a good thing to do; therefore I shall consider it unnecessary to enlarge upon this point, though the names of those who have advocated the plan would include the most representative in the artistic and educational worlds, and the facts adduced from what has already been accomplished would give interesting information to others who need encouragement in their attitude towards the question, but rather shall I turn your attention to what may suggest themselves as good ideas to follow, based upon actual work in the schools of Boston.

The very first item for consideration is the tinting of the walls. It is only very recently that school room walls have been anything but the bare white plaster, and this condition prevails in many cities and towns at present, but Boston has happily outgrown this period, and now all classrooms are tinted some sort of color, but usually far from the right one.

The result of my experience has been; first, to select colors which will not absorb the light; second, to lay them

on the wall so as to give a flat and dead surface, that there may be no reflection; third, to use colors which are harmonious and artistic in effect, and last, colors which are soothing, not irritating, to the optic nerve.

Upon this latter item a celebrated specialist has given me his professional opinion, and, as I have followed his ideas so far as his point of view is concerned, it would be well for me to quote the following from his report: "The walls of all schoolrooms should have some color; for I have often seen children immediately and permanently recover from a persistent recurring diseased condition of the eyes when removed from a school room with white walls, and sent elsewhere to school, or kept at home, where the walls are tinted. The principal color of the walls should be of an even tone, so that the amount of light reflected will be the same from all parts of the surface—as waving or clouded effects are very trying to sensitive eyes. Any color may be placed in its proper position with regard to its safety for schoolroom walls by remembering the general rule with regard to the sensitiveness of the eye to the colors of the spectrum, which is that the nearer the color is to the red end of the spectrum, the more irritating it is to the eyes; and the nearer the color is to the blue end of the spectrum, the easier it is to the eyes, with the single exception that the extreme violet rays are also irritating.

From this it will be seen that red and all its derivations should be rigidly excluded, and orange also is nearly as bad, while yellow should never be taken by preference, but may be justifiable in an otherwise dark and badly lighted room. Greens and blues are absolutely safe colors, and it is not at all necessary that the

colors should be pronounced ; the depth of color should be made dependent upon the amount of light coming into the windows, and upon its quality ; as, for instance, whether the windows have a northern or southern exposure, whether the sun's direct rays can come directly into the room when the sun sinks low in the heavens in the middle of a winter afternoon, and other surrounding circumstances of each individual room.

The color of the ceiling of a schoolroom is fully as important as the color of the walls, particularly when there is any amount of reflected light.

All I have said with regard to the color on the walls is doubly true, when applied to the color of the window shades, and this fact should always be taken into consideration in furnishing and decorating a school room.\*

In November, 1894, under the auspices of the Public School Art League, the New England Conference of Educational Workers, and the Boston Art Students Association there was held in Boston an exhibition of photographs, being reproductions of standard works of Art suitable for school room decoration. Also in Brooklyn, during the months of March and April of the present year, there was held a similar exhibition, under the direction of the section on Art Education of the Brooklyn Institute of Arts and Sciences.

These two events are the most important connected with the subject of school house decoration, since the movement began in this country ; but there is yet to be held an exhibition, which shall give a clear idea of the proper order of pictures, perfectly suited to the age

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\*Report written by Dr. Myles Standish, Boston.

and understanding of the child, from the kindergarten through the High School.

In these two exhibitions I refer to, nearly, if not quite all the photographs belonged to the highest grades of the grammar, and more particularly to the high school, and while on general principals, association with works of art of the highest order cannot begin too soon, yet we want more than association, or mere contact with environment; we want interest, and in consequence, understanding.

To explain somewhat more in detail I will give a rough outline, merely suggestive of how I should distribute works of art through the different grades.

For kindergarten and primary grades I would suggest pictures of the simplest natural objects, such as birds, their nests and eggs, wild flowers, trees and scenes of rural life, such as town children seldom see, and country children often fail to enjoy. Pictures of animals in friendly relation with human beings, especially with children—landscapes and marine views—some of these various subjects to be illustrated in color, care being taken in the selection with reference to artistic merit.

For grammar grades I would use historical portraits and scenes from history, with particular and special reference to the men and events connected with the life of our own country; pictures of architectural works of historic or artistic interest; such reproductions as are available from the numerous works of old and modern schools of painting; and as many of our boys and girls do not get beyond the grammar school, a judicious selection of casts from the antique should be included.

For high schools, you have simply to choose from

the best, the product of all the ages ; the art of Greece and Rome, the Renaissance, down to the present day ; the field is broad, and the task is easier.

All these subjects I have so briefly outlined have their practical uses in the school room, in correlation with drawing, history, geography, and natural history, and certainly the æsthetic sense is pleased, and the daily routine made pleasanter, amid such surroundings ; for nothing to my mind is more depressing than bare walls, and most of us can recall the fact, that such walls existed without exception in the days of our early training.

The present generation cannot do better than to inform itself somewhat as to what constitutes American art, and particularly that portion which belongs to the periods of the wars of the Revolution, illustrated through the masterly portraits of that prince of portrait painters, Gilbert Stuart, and the historical pictures by Jonathan Trumbull. I trust the day is not far distant when their names and their works will be known to all the children of the land.

In addition to selecting photographs and cases with reference to their character and suitability to age and comprehension, I should advise that they bear a relation to one another, and in order to accomplish this it will be necessary to fix upon what you wish to illustrate upon the walls of some particular school room.

Let it be a Greek room, Roman room, Egyptian room, or let it illustrate English literature, French history, or different sections of our own country, through photographs representative of characteristic features, birds and animals, etc., etc., but let all these different

subjects be placed by themselves ; to mix them up in one room, no matter how good in itself each particular object may be, results in discord, though there may exist certain conditions which might render it necessary to include a variety of objects in one room.

It is always best to give a good frame to every photograph, and it is always desirable to frame under glass. It is not usual or customary for us to use cheap frames and no glass in our homes—why should we do less for the school room? And with more reason, because where the poorer classes are concerned the influence of the children will be felt upon the home.

The very best form of reproduction is none too good, and though financial conditions are not always such that you will be able to carry out the plan of obtaining the best, nevertheless that is the thing to aim at, and attain, if possible ; for in no country to-day does there exist such a broad field for good as through bringing the best that art has to offer into our school rooms.

In the old world the æsthetic sense is constantly stimulated by what is offered on every side, while in our own land, where art is to have her future throne, at present we have barely made a beginning.

The next generation is to witness an immense advance in all that relates to the Fine Arts, therefore it is important that we prepare the way, “ and though the amount of time given to æsthetic subjects in the public schools is small, and to increase it is entirely out of the question, yet all the more for this reason does the plan of decorating schoolrooms deserve, as it is now receiving, favorable consideration.” Surround young people during school hours with pictures and statuary, set off by tinted

walls, and the silent beauty irradiating therefrom will quicken and purify the taste without encroaching upon school time, or interfering with school work ; but while we agree to this, and while we welcome all that can be accomplished in this direction, let it be remembered by those who can aid the most in this work of interior decoration of school houses, that primarily school houses are for practical ends, towards whose fulfilment the introduction of objects of Art must serve as a valuable aid and not as an impediment ; in fact, I sincerely trust that the School Committee of the future will consider the furnishing of the walls of a schoolroom as much a part of its duty as furnishing desks and books ; for, as Americans, we have developed too much on one side, considering nothing but that which appealed to us as practical, and ignoring that through which the glory of the past has been handed down to us.

## IV.

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### THE RURAL SCHOOL PROBLEM.

#### Close Supervision.

BY HON. MASON S. STONE, STATE SUPERINTENDENT OF SCHOOLS, VERMONT.

It is a truism that the character of the school is the character of the teacher ; it is no less a truism that the character of the schools is the character of the supervision.

The prime factors of good schools are, plenty of children, good school houses, adequate appropriations, abundant supplies, sympathetic communities, competent officials, good teachers, and skilled supervision ; but upon these two—good teachers and skilled supervision —hang all the law and gospel of good schools. We can get along with barn-like structures for school houses, for the outward symbols of magnificent buildings do not make the schools ; we can get along with meagre appropriations, for consecrated energy is not measured by dollars and cents ; we can get along with scant supplies, for necessity and ingenuity will devise sufficient ; we can get along with unsympathetic communities, for their influence for help or hindrance is nil ; we can get along with incompetent committees,—such as exist in one New England town, one-half of whom are capable of nothing, and the other half capable of anything,—

for good schools have existed without such; but we never can have good schools without good teachers. We cannot have better schools without better teachers, and we cannot have better teachers without better supervision. We have had good schools because we have had good teachers, and we have had poor schools because the teachers were poor; but we can have all good schools by close expert supervision.

The necessity of expert supervision rests on two facts: 1. Very few teachers are specifically endowed for their work. 2. Limited tenure of service.

In consideration of the first fact, let it be understood that we say "specifically endowed." The day of specialism is not passed, but the idea that every individual is specifically endowed for some particular vocation is passing. Mankind is generally endowed, and providentially so, otherwise inadaptability to circumstances would arise and failure would result. Now teachers in general are no more highly endowed for the administration of the duties of the school room than they are for some other occupations, and because this is a fact there is need of some one specifically endowed, or some one especially equipped by nature, training and experience to direct the energies of the teacher; namely, an expert supervisor.

It may be asked, cannot our normal, training, and summer schools do the work of the supervisor? We reply, impossible. Such schools can help mightily in the general outfit of the teachers, but such schools cannot adapt a teacher's work to details and conditions, cannot adjust it to a system, or correlate it with the work of other teachers in a town. Furthermore, it must be

remembered that less than one-sixth of our rural school teachers have normal training, and the day is far distant in most of our states when the legislatures will make such training a pre-requisite for employment in teaching.

The second fact making expert supervision necessary is the brief tenure in office.

When we consider the fact that the length of service of the ordinary rural school teacher is only about three years, then we understand why teaching is not a profession. It is generally admitted, save by the teacher, that teaching is only a temporary occupation, employment until a desirable alliance can be made,—with the motives of matrimony on one side and patrimony on the other happily adjusted,—or is for "revenue only." Because such is the prevailing state of affairs there must be some official capable of passing on the competency of the employed, training in principles and application, and stimulating and controlling the outletting of energies.

#### EXTENT OF TERRITORY.

In the consideration of close supervision it is necessary to discuss the various systems under which it is in operation,—the town, the county, the combination of towns.

Under the form of government established by the New England colonists, the town was the unit and all town affairs were administered by town officers. Old New England is so thoroughly anchored to the traditions of the elders, to puritanical ideas and customs, that it is difficult for her to entertain new systems and methods without an impulse to cry heresy. But however

good the town system of supervision may have been in its day and generation, there is now a new testament of better things. The town system of supervision has its advantages, but its disadvantages so evenly balance that its good offices are of small avail.

The primary cause of the ineffectiveness of the town system of supervision is the limited territory. Limited territory, limited time, limited compensation, limited ability, is a natural sequence. The ordinary rural town contains on the average about ten schools. This number is far too small to employ profitably the services of a superintendent all the time, and because he is not employed all the time—in Vermont only about one-tenth of the time—supervisory work is made secondary to some other occupation, trade, or profession; hence is feeble and inefficient.

Not only does the town system of supervision fail as a town system, but it fails as a state system on two counts, the multitude of supervisory officers and their general incompetency. As the number of sub-officers decreases, the ability of the chief officer to keep in immediate touch increases. Because of this multitude of sub-officers and their general incompetency, it is impossible to carry out any educational policy; there are no well equipped agencies for the transmission of plan and purposes, and no qualified officers for prompt and effective execution. Hence there is no uniformity, no coherency, no state system.

#### COUNTY SUPERVISION.

Contrasted in size of territory to town supervision is county supervision, which also fails in its effectiveness.

It must necessarily fail; it is as much too large as the town is too small. Too much is expected of a county supervisor. He tries to spread himself over too large territory; to become an octopus. His visits are angel-like. As a result, he cannot come in immediate contact with the school as often as he ought; consequently, and in the same degree, his services fail of intent.

County supervision cannot be termed close supervision in New England. In some of the western states it is in operation, but other agencies enter in to make it operative. There cannot well be formed a combination of town and county supervision, for, under such circumstances, those in immediate contact with the schools would still be unskilled and incompetent.

If the county is too large and the town too small, there must be a happy medium of the two, and this is found in the combination of towns.

Two states in the Union—Massachusetts and California—have practically solved the rural school problem. California has solved it by supporting all her schools from the state funds, and thus can give the little school up among the mountains as good advantages, comparatively, as the best graded schools. Because all her schools are supported and managed by the state, expert supervision is afforded to a certain extent. Massachusetts has solved the problem through her system of district supervision, or combination of towns. The superior reputation Massachusetts enjoys and deserves is due more to her system of immediate, skilled supervision of her common schools than to any other agency. This fact is attested by those who, from official position, have had an opportunity to observe and testify to the growth, development, and fruiting of the system.

The territory included in a district should be governed by the number of schools, rather than the number of towns. Allowing two visits per day and thirty weeks per school year, a district superintendent can supervise fifty schools. Accordingly, the minimum number for combination might well be placed at thirty-five and the maximum at seventy.

#### EXPENSE.

Skilled supervision will be necessarily more expensive than unskilled supervision. In all departments of life it is skilled service that is demanded, and skilled service that demands the highest wages. But even if skilled supervision is more expensive, it will pay for itself,—not by decreasing the expense in some other department of school work, but by increasing the power and efficiency of the novice and the untrained teacher. There is, however, one source of wasteful expenditure which is more than adequate for the extra expense of expert supervision; namely, that expended upon small and unprofitable schools.

If the burden of expense is thrown directly upon the people, they will naturally recoil and decline close supervision. But even if the people were willing to assume the expense, it is not consistent with that large and righteous idea that an education is a common good. The boy is not to be educated for himself, nor for his father, but for society and the state; and because this is so, the state ought to be more generous than it is, and furnish the general appliances and means of an education. Consequently the state should assume the

expense of supervision, either in whole or by far the larger portion.

The salaries to superintendents should be equal to that paid the principals of the high schools and academies in rural places, and men equally good should be secured.

#### NEED OF SUPERVISION.

In agricultural states or sections of states where population and schools are sparse, where there are not the facilities for the dissemination of ideas and methods, there is the more need of some agent who shall serve as a general dispenser of those things most helpful to our schools, most desired by our teachers, and most economical in the administration of educational affairs. If Massachusetts, with her trained teachers, her high compensations, her numerous cities and large villages, her superb facilities, demands expert supervision, much more do the rural sections of our country.

If, in the labor, commercial, and industrial worlds, there is confessedly need of trained practical supervision, is it not reasonable to presume that in teaching, the highest of all occupations, there should be supervision of some skilled character. The operative works upon wood, wool, cotton, metal, or other material, is engaged in a simple process, exercises but a few faculties, expends but little nervous force ; the teacher works upon mind and heart, is engaged in complex processes, exercises each second all the great powers of the soul, exhausts nervous energy in the various and varying processes of work and conditions. In no other occupation

are there so many ways and opportunities for wasting time and energy and making mistakes as in teaching. It is far more difficult to mould mind than matter; far more difficult to know what to do, how to do, and when to do, than in any of the industrial trades; hence the greater need of expert supervision.

We can see material results of skilled supervision in various lines of labor, such as road-making and house-building; but mental results are not so immediate, so visible, so tangible; yet are infinitely more influential and enduring.

#### CHARACTER OF SUPERVISION NEEDED.

Superintendence of the character the rural schools need and demand must be administered by a man who by study is thoroughly versed in the science and art of pedagogy, the principles and methods of teaching, the philosophy of child-training, and the educational values of school subjects, in order that he may formulate a rational course of study for schools, and direct and systematize the work. He must be progressive, enthusiastic, ready to investigate, but not always ready to accept every new idea; he should have had large experience in ungraded schools, for of such are the rural schools, and should be thoroughly acquainted with the needs, conditions and means of remedy. This is all professional, is an art, and needs preparation for as much as teaching. In a general way, and no less important, he should be versed in the proper construction, repair, and furnishment of school houses, together with the best means of lighting, heating, ventilating, and providing other sanitary arrangements.

## RELATIONS.

From his professional equipment and the nature of his office the skilled superintendent gains the attention and confidence of the people, and thus becomes the director of the educational policy of the town and champion of its highest interests. His relations with the people are indirect, through the children or through appropriations. Parental interest in the school centres chiefly in the child. In case a rupture occurs between parent and teacher over an aggrieved child, then the superintendent serves as a mediator, and can amicably adjust matters so that no estrangement will continue, but the relations between teacher and child become cemented. Even should an occasional exhibition of hostility to the school occur, it is not so much to be dreaded as the general apathy of the people. Whenever interest is awakened hostility disappears, and right here is the high service rendered by the trained, tactful superintendent. In his relations to the people his energies will be directed to this end. To do this, school exhibits, exhibitions, contests and rallies can be held, and people can be induced to attend and incited with a larger interest. Teachers' conferences or public educational meetings can be held, and the people stimulated to attend and become acquainted with the progressive educational movements, and infused with their spirit.

A healthier sentiment and a more generous impulse can be aroused, so that only the best men will be selected for officers, only the best teachers employed, only excellent school buildings provided, only adequate equipments allowed ; so that indifference will be changed

into interest, apathy into activity, good schools to better, and better schools to best.

#### SCHOOL DIRECTORS.

Only experts can select experts. Too frequently the employment of a teacher is a venture on the part of the directors. The skilled superintendent tries the polariscope test, and if he finds the teacher up to grade, recommends appointment to a school according to ability and adaptability. He can instruct in regard to the proper construction, repair, heating, ventilating and furnishing a building. He can advise wisely in that delicate matter, the selection of proper books, for he has acquainted himself with all the latest and best—in these detail matters the ordinary school official certainly is not an adept—he knows the proper equipments, and knows, also, where they can be purchased at most reasonable rates, and thus can direct in the most economical and proper expenditure of school moneys.

#### PUPILS AND TEACHERS.

Boys in school need the contact of a manly man outside the home, as much as girls need the contact of a womanly woman. The presence of a man of strong personality is an inspiration and a benediction to any child that comes under his influence. He can stimulate the pupil to greater effort, to higher ambitions, to loftier purposes, to an earnestness for further education than the common school affords, so that our high schools and academies will have to enlarge their capacities to

receive those who will be knocking at their doors. His immediate relations with the pupils will consist in proper classification of them, testing their work, directing them in their studies, and promoting them in classes according to attainment.

It is axiomatic that, as the teacher, so the school—a truth universal and unchangeable. But in the fullest meaning of the term the superintendent is a teacher. He is a teacher of teachers. His chief duties are to instruct what to do, how to do, and when to do. He is not merely an inspector; he is a director. This is the purpose of his office and implication of its name. One may be an artist in his ability to criticise, direct, and help other artists in performance of their work. So with the skilled superintendent: he may not be able to exercise greater tact and skill in instruction and management than a teacher, but he may so thoroughly understand the principles and methods of teaching that he can direct the teachers in the most economical expenditure of time and energy to the highest efficiency in work, and most adequate returns for compensation received. Probably the greatest direct service rendered by the expert superintendent is to the teachers.

A novice enters upon her work, crude in her ideas of organization, untried in her administrative ability, and ignorant of best practical methods of instruction. Here is the superintendent's opportunity. He can change rawness into ripeness, and so direct the energies and work of that teacher that the result secured will be four-fold greater. He can enable teachers to properly classify their pupils, and aid in the general administration of school affairs. He can give words of cheer to

the discouraged, spur the sluggish, advise the careless, direct the beginner, praise the faithful and efficient, and give a mighty uplift to the whole system.

#### RESULTS.

Wherever, in the union of states, there is found any section blest with excellent schools, invariably there is found excellent close supervision. Schools are good as supervision is good, and poor as supervision is poor. There is no better, speedier, or more economic way of improvement of the public schools than by placing them under skilled supervision.

Hon. William T. Harris, United States commissioner of education, in the initial sentence to "Pickard's School Supervision," says:—

"There is no other device in our school system that has done so much for the improvement of our schools in organization and in methods of instruction and discipline as school supervision." This is indisputable authority.

Nothing has done more for the public schools than skilled supervision, and nothing will do more. The success of the past is the earnest of the future. The system by which it must operate in the rural sections of our country is by the combination of towns. It has proved its merits, and need no longer be considered a scheme.

In all branches of human industry there is a tendency towards specialization, and as labor becomes more professional, the need and demand for supervision increases.

In the past ten years more books on teaching have been published than in all the previous years of the world's history. Does this not argue that teaching is becoming a profession, is being recognized as an art, is elevated above a system of dynamics? Nevertheless, the only way in which teaching can become a profession in any state is to make supervision a profession. Teaching cannot well rise above its supervision.

In no other occupation ought the underlying principles to be more appreciated, and in none are they less so; in no other can greater art be displayed, and in none less; in no other ought greater skill to be exercised, and in none less; in no other is more urgent need of skilled supervision, and in none is there less. With trained supervision we can have trained teachers,—teachers who will recognize the underlying principles of child-training, evince the knowledge of subject and the art of impartation, apply skill in the development of all functions, and exercise sound sense in matter, method and management. The new educational era is to be ushered in through close, expert, district supervision of the rural schools.

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### Training of Rural Teachers.

BY STATE SUPERINTENDENT W. W. STETSON, MAINE.

We are not prepared to state what the training of a teacher of a rural school should be, until we have first ascertained the circumstances in which she will be placed, and the work she will be called upon to do.

In many of the country schools the yards are too

small for the purposes for which they are used, and are covered with bushes, weeds, and refuse of various kinds. The outbuildings are, in many instances, a physical and moral menace to those who have to use them. The compartments for the boys and the girls are usually in the same building, and the partitions between them are more or less broken down. The doors are off the hinges, and the window panes are broken. The exterior of the building called the schoolhouse may or may not be painted. The interior will, probably, show evidences of having been occupied by both the young and the old barbarian. The walls are dingy, the blackboards are mutilated, the stove is rusty and refuses to do service; the stove pipe has a broken back, the chimney is stained with creosote, the desks are made of planks, and of a pattern that shows great ingenuity in their construction, the seat being fitted to produce the largest amount of torture and the least amount of comfort possible: the desk of the teacher is more or less crippled by age and hard usage; her chair may support its occupant if carefully used.

The children who present themselves as pupils are boisterous. They talk in harsh, shrill, high-keyed tones, and show a deplorable want of respect for the building, the school, and, in many cases, for the teacher herself. The parents are not infrequently hostile or indifferent, and are ready to accept any statement made by their children about the work done or the requirements made. They are willing to criticise the school harshly upon *ex parte* evidence, and seldom visit it to make a study of its aims and work. They seem to think that the whole institution, including the instructor, are legitimate victims for their attack.

If one were to put in blunt, categorical statements the crying evils of the rural schools of to-day, he would have to say that the physical conditions and surroundings are inartistic and unwholesome; that there is a want of interest in and sympathy with the work of the school on the part of the parents, and that, added to these, are a lamentable ignorance of the work they are, or ought to be, doing, and an active opposition to any changes from the forms and methods used when they were children; that the teachers are grossly and densely ignorant of the facts they are supposed to teach; that there is a deplorable want of thoroughness in the work attempted by the pupils.

While the above statements are much too severe to be a fair description of our best country schools, they are not severe enough to properly characterize the poorest schools of the rural sections of our country.

The question that now presents itself is, what training must the teachers of these schools receive to fit them to help the boys and girls to make the most of the best in them? As has already been indicated, the average teacher in the country school does not know the subjects she is expected to teach. She has never made a study of children, and, therefore, has little knowledge of those whom she is expected to train. She has not read books on education, and she, therefore, has no knowledge of the methods used in what are termed our best schools. It goes without saying that a teacher must know the facts she expects to teach so familiarly that she is practically unconscious of her knowledge. If they are retained by an effort of the memory, or understood by a constant exercise of the intellect, they serve

to load and embarrass, rather than strengthen and aid the teacher. To gain this mastery she must, for a series of years, make a systematic and diligent study of the various subjects pursued in our elementary and secondary schools. In addition to this work, the teacher must be trained and exercised in such a study of children as will enable her to recognize their deficiencies and capabilities, and the reasons for the various conditions which are found in the different children who come under her charge. She must also have such knowledge of methods as will enable her to adopt, adapt, and use with skillful individuality the best that the profession has developed in the matter of instruction. In a word, she must have pursued such courses of study as will be equivalent to the requirements prescribed for our elementary and secondary schools, and must have done, at least, one year's thorough work in the study and practice of methods in a model training school.

But, in addition to all this study and training, she must be able to read, appreciate, interpret, and inspire an interest in nature. The fragrance of flowers, the music of birds, the charm of scenery, must appeal to her, and not appeal in vain. She must be able to count the pulse of nature, as well as to make analyses, classifications, dissections, and to name parts, describe habitat, and locate species. She must be so familiar with history that it will be easy for her to discover the point from which we started, the paths we have travelled, the places we occupy, the direction in which we are going, and the training these experiences have given us. Art must make to her some revelations, tell some story, furnish some inspiration, be a means of grace and blessing.

Literature must appeal to her, because of the beauty of its expression, the richness of its thought, and the warm life-blood that gives it a right to live and serve the world. She must know intimately the masters who have made the progress of the world possible. She must be able to appreciate in what the value of their service consists, in what way they have helped the world, and why they have won the love and reverence of the lovers of the race. The purity of diction, the depth of feeling, the harmony of rhythm of Longfellow; the patriotism, sincerity, and rare revelations of Whittier; the literary skill, wealth of illustration, richness of suggestion, interpretations of life of Tennyson; the patience and faith of Columbus, the sincerity and fortitude of Washington, and the honesty and simplicity of Lincoln, must influence her work, and must be influential with her pupils, because she loves these things and breathes their atmosphere.

No teacher is fitted to take charge of a school in a rural community who is not prepared to meet and mingle with the parents in such a way as to develop in them an interest in the school, its housing, its surroundings, its needs. She must be able, by suggestion and instruction, to give clear and accurate details as to what should be done to put these things in such condition as will make them a means of training in themselves.

In a word, she must be a scholar in the sense that she is a master of facts. She must have such knowledge of methods as will enable her to use the best the profession has produced in its years of experiment and travail. She must be a wise and skillful interpreter of nature, and inspirer to study its mysteries and beauties.

The walls of her school room must be graced by the Angelus, or one of its peers, and she must feel the difference between its beauty and the history it embodies, and the semi-nude and wholly crude advertisement of a popular brand of tobacco. She must know enough of literature and song to introduce her children to some of the masters who have made the world better by giving to it of their best. She must know enough of landscape gardening to enable her to suggest the changes that will convert her wilderness schoolyard into a scene fair to look upon. She must be enough of an architect to know how to improve the exterior and interior of her school building. And, above all, and more than all, she must be strong enough to influence parents and children in right living, right feeling, and right doing, because of her personality. Her unconscious influence must tend to develop in the children gentleness of tone, purity of life, aspiration for ideals. She must be a woman, strong, pure, devout, devoted, scholarly, and inspiring.

How is this paragon of wisdom, culture and skill, to be secured? Experience has demonstrated that each community gets just the quality of teaching it demands. Better teachers can be secured by insisting upon better results than the present furnishes, by insisting upon, at least, one teacher of the best type in each town, as a pattern and inspiration to all the teachers and communities of the town; by consolidating the schools of the town, as far as consistent with its geographical limitations, and by furnishing transportation for all pupils who have to walk to exceed a certain distance; and by using the money which is saved by refusing to maintain unprofitable schools, to increase the pay of the teachers

who have charge of the combined schools, until their salaries reach such a sum as will command the best service that experts can render.

This, in my judgment, is no impossible ideal. Statistics prove that the best quality of teaching pays the highest dividends in dollars and cents. The whole question turns on the point, can the parents be induced to make a profitable investment? I am persuaded, that, if those in authority would set their faces sternly against incompetent teachers, would devote their energies to interesting the parents in a high grade of instruction, the time will be materially hastened when those who take charge of our rural schools will be fitted to render a service to the children who are placed under their care which will prepare them to do the work the world needs to have done. This cannot be done so long as school officials will voluntarily employ untrained teachers and refuse to consolidate schools, because of objections made by parents, and so long as they put into their work so little of intelligent study, and quiet, common-sense backbone.

One could not justify himself in speaking so plainly of what some of our teachers are, and so dogmatically as to what they should be, if he failed to say a word to the instructor who prepares them for their work, and the superintendent who directs it. Both of these must know enough of teachers and teaching to realize that the best teachers are trained in the kindergarten of observation, the high school of study, and the university of experience. They must be able to correct the vagaries of the visionary, to utilize the visions of the enthusiast, to help all to have that best quality of the teacher,

vision. They must modify their instruction and directions by the fact that we have gotten beyond the age when it was the whole duty of the scholar to study books. They must realize that we are enduring all the horrors incident to a furor about a study of things. They must have discernment enough to see that we are at the dawn of the day when the work of the pupil is to study life, and of the teacher to be its interpreter.

If they are fitted for the work they are given to do and the positions they hold, they will know that experience and a larger wisdom have reversed ninety-five per cent. of the decisions of reason, and confirmed an equal proportion of the prophecies of the poet. They will not urge or permit the most of the teacher's effort to be wasted in appealing to the senses or the training of this quintette of modern deities. They will seek to reveal the invisible, to help teacher and pupils to profit by the fact that the subtle life that quivers on the canvas, breathes from the printed page, and pulsates in bird and flower and gem, is worth more than the beautiful colors, the glowing words, and the gracious comeliness that embody it. They must recognize that it was the high priest of the sanctuary of beauty who warned us "not to lose an opportunity to see anything beautiful, for beauty is God's handwriting, a wayside sacrament. Therefore, welcome it in every fair face, every blue sky, every tinted flower, and thank Him for it who is the fountain of loveliness, and drink it in simply and earnestly."

They must appreciate the truth that while facts are important things, and, like the poor, they will always be with us, yet they must prevent teacher and pupils from

becoming beasts of burden, willing to bear the weight of infinite details that can be better housed in books than in heads. School room instruction, like conceptions of life, needs perspective. Perception of expression, relation, harmony and proportion are more important than a knowledge of alligation. They must be able to inspire in the teacher the feeling that it is the spirit with which she works, the purpose she has in view, the motive that holds her to her task, that limit not only the extent, but the value of her service; that it is only when she is moved by such forces that she has a just sympathy with all worthy effort, a true harmony with all life, a full recognition of all beauty, and a prompt hospitality for all revelation.

They must not allow the teacher to feel for a moment that systems of instruction and the knowledge acquired are of greater value than the power developed in attaining a mastery of them. They must be made to feel that self-control, concentration, endurance, application, appreciation, insight, receptiveness, responsiveness, are on a higher educational plane than a knowledge of insignificant towns, unimportant dates, and meaningless definitions. The teacher must be warned against aspiring to furnish brains for her pupils. She must not presume to do their thinking, for such things are an injury to both, without being of service to either.

School officials must bear in mind that teachers, like other human beings, do the best work when they have verge, scope and choice. If their personality is respected, their judgment recognized, and their aptitudes considered, they are stimulated to do their best work.

We must all recognize the fact that we cannot retain

our courage to work unless we see more years into the future than the record tells us have passed. We must possess our souls in peace, discover whence life came, whither it is going, and be content to add our contribution to aid in giving it depth, breadth and richness.

It should give us pause when we remember that the school and the pupils take their color, tone, and atmosphere from the directing power, and that a large share of the teacher's training is received after she comes under the superintendent's control. Hence he must be clean, kind, hospitable, broad-visioned, large enough to be willing for others to be larger than he, strong enough to be gentle, and wise enough to be simple.

The cities have a vital financial interest in the work done by the rural schools. Recent statistics show how largely the cities are recruited from the rural sections of the country. The financial value of a citizen depends largely upon his education. The cities desire citizens who are intelligent, progressive, prepared to work, and accustomed to a style of living that will make them users of the material produced or distributed by the towns. They are interested in having in the country the same quality and character of people, for the same reasons.

Therefore every one who has a care for the prosperity of the cities has a special interest in the quality of the work done in the rural schools, because they are, in these communities, the centres of intellectual activity. They furnish the means and inspiration of mental growth. In them some pupils are learning to read, and others are studying solid geometry. If the boys and girls become interested in books, that interest must be aroused in the

local school. If they are stimulated to go on to the higher schools, that stimulus must come from the same source.

These considerations make it clear that the teacher in the rural school must have the broadest training of any one connected with the public school system, and that you have a large concern in promoting all means that contribute to this end.

#### DISCUSSION.

Remarks by Hon. Thomas B. Stockwell, Commissioner of Public Schools, Rhode Island :

In the brief time allotted me for this discussion I can but touch upon a few of the points which present themselves to me in my own experience.

The solution of the rural school problem undoubtedly depends upon many conditions, prominent among which may be mentioned the teacher and the character of the supervision extended over her; but to my mind there is one that far exceeds either of these in importance, or indeed all others, and that is the question of pupils. The best teacher in the world, placed in the most approved school house, and supervised by an expert of the highest order, cannot teach a good school unless she has some pupils. Now what are the facts in Rhode Island? In 1880 the number of ungraded schools having less than 20 pupils was 151, out of a total of 294; in 1890 it was 167 out of 266; while in 1895 it was 158 out of 263. If we look at the number of very small schools we find the showing still worse, as the number having less than ten pupils increased, from 1884 to 1895, from

40 to 58, almost fifty per cent., while the number having over 30 pupils decreased in just about the same ratio.

We have one town running twelve schools with a total average attendance of 125, another of fifteen schools with an average attendance of 136, and a third of twelve schools and an attendance of 109. Now I respectfully submit that no solution of the school problem for such communities will avail anything that does not begin at this point, the *vital* point to the whole question. No school too small to allow of a reasonable degree of classifying and grading can be made to do good work continuously. Under exceptional circumstances and for short periods of time satisfactory results may be secured, but the moment the favoring conditions disappear the work fails to come up to the mark.

Interest, life, vitality, enthusiasm, upon which so much depends, cannot be generated in a mere handful of pupils, any more than we can achieve success in an attempt to build a fire with two or three pieces of wood or coal. It demands enough, so that as the heat or vitality is produced it may be passed to, and absorbed by, the others, and not dissipated in the air. The amount of intellectual and spiritual energy that has been wasted in these small schools in the last two decades is something fearful to contemplate. Could it have been properly conserved and applied, our educational status would have been widely different from what it now is, and the present outlook much more satisfactory.

A second point of supreme importance upon which the solution of this problem depends is the one so clearly enunciated by Supt. Aldrich in the first paper of this session, viz., the attitude of the people. As pre-

sented by the essayist, it was with relation to the "new" problems, so called, in the educational world, but the principle involved holds true with even greater force in the readjustment of this, the first original problem; for are we not in this matter simply endeavoring to provide, in a rational, satisfactory manner, that elementary education for these children which the common school was first established to supply to all children?

It has been my experience to find that but few persons in these sections where the children are not many in number and the schools so very small realize at all the true condition. Most persons are well enough aware that the schools are poor, that they no longer are centres of intellectual life and activity, that they have lost all power to attract the children, but they have made no progress in the direction of an explanation or of a remedy. The usual course to pursue is to lay the whole blame upon the teacher, and so to seek improvement through change; but this only serves, in most cases, to intensify the difficulty, without ever, even where a temporary improvement is secured, touching the root of the matter.

Hence, when any proposition is made looking to an improvement in the schools through some modification in their system of management, it is invariably met by an opposition that is persistent and unchangeable in proportion to its lack of appreciation of the situation. The facts that the local community is no longer the chief support of its school, but that the town and state now furnish by far the greater share, that the total number of children who can possibly attend is less than one-fourth what it was in former days, that the lapse of time has

created new standards, while the schools have been held to the same old course,—all these and more are passed by as having no bearing upon the subject. A bit of authority is deemed of greater moment than any conceivable gain in efficiency for the school, while a school near at hand, no matter how poor, is to be preferred to one to which pupils may have to be conveyed, even though it be first-class in every respect.

I do not believe the schools in the country towns, so called, can ever be much improved until there has been a change in the dominant sentiment of the people. The case is not so much one of modification as of reorganization. For the extreme method of local control must be substituted that of a more central and comprehensive system, while the policy of locating the school within easy reach of the pupil must give way to that of providing for the pupil suitable means of reaching the school. But these things depend, not upon school officials, but upon the sovereign will of the people; hence the key to the situation is found in the creation of a more enlightened public sentiment.

Another factor we cannot ignore in this question is the financial one. There is nothing good to be had in this day without expense, and it is idle to expect that our rural schools are to be made capable of satisfying our modern ideas at the same cost as those which we are seeking to supplant. It is equally true that many rural towns are already taxing themselves as heavily as they can endure. With us, our annual state appropriation for the support of schools is paid over to the several cities and towns upon the condition that each city and town shall raise, by taxation for the support of public schools,

an amount at least equal to that which it receives from the state. Of course, in the case of most of the towns, the amount actually raised is in excess, and in some cases largely so, of this sum, but in some of the towns having only a rural population, in order to simply comply with the minimum requirement, it is necessary for them to tax themselves up to the point where it is a heavy burden. One town, in order to provide this minimum support for its schools, which secures only 145 days of schooling in each year, and gives to male teachers an average salary of \$242.24, and to female teachers \$215.64, is obliged to tax itself nearly twice as heavily on each hundred dollars of ratable property as the city of Providence, with its complete equipment of school facilities, a school year of 195 days, and an average salary for male teachers of \$1,444.76, and for female teachers of \$579.83. There are other towns where the discrepancy is not quite so wide, but still so great as to reveal the fact that more even excellence in the character of the schools of a state cannot be secured except by some process by means of which the "sinews of war" may be more evenly distributed. The centres of population and wealth in every commonwealth have a duty to discharge in this direction. Much of the best blood and brain which have made them what they are came out of their country towns and country schools, and it should be their delight to prove their loyalty and love for their early home by sending back to it some tangible proof of their successful achievement.

But it must not be thought that this problem of the schools is mainly a financial one. As we have seen, the money question is important, and in some cases it

is a leading feature, but as a rule it is by no means the main one. There are two towns in our state, wholly rural in their character, where the average salary paid the teachers last year was, in one case, \$463.90, and in the other \$412.91. In neither instance do the schools rank among the best in the state, and of the two towns those of the one paying the smaller salary are far the better. In nearly every town, within the last fifteen years, the salaries of teachers have increased from ten to sixty per cent., while the schools have shown no such improvement. Increased appropriations, necessary as they are, unless expended upon a different plan, and supplemented by proper supervision, will but add to the cost without increasing the value.

Allusion has been made by one of the speakers to the value of the teacher's personality. There is no place where this tells for more than in the rural school. There is nothing between her and her pupils; practically she is the system; there are no rules but those of her own creation, no restrictions save such as the time and place impose. In many communities she is the central figure and gives tone and character to its best life.

I have in mind one young lady who recently went out from our Normal School into one of these rural schools where the educational thought and feeling were on a very low plane, the equipment of the schools the same as it was forty years ago, though there was no lack of financial ability. In a single year this young woman, by her earnest, faithful, and skilled work in the schoolroom, and her tact and persistence among the people, created such an interest in the schools and their proper development that they voted almost unanimously to build one new schoolhouse

large enough to take the place of the several single buildings scattered over the town.

There is another teacher, whose term of service is now over, and who is quietly awaiting her transfer to the "rest that remaineth," who taught for many, many years among the smaller schools of one of our rural towns, and whose presence in any district was always a benediction and a blessing. In 1882, a law was passed in our State offering the aid of the State to any town, district or school for the purchase of books of reference and illustrative apparatus. From the passage of that act up to the date of her withdrawal from active labor this teacher was a minister of that fund to that section of the State. I was as sure of a call from her for an order on the State treasury whenever she went to a new school as I was of the rising of the sun, and to-day there are few districts in those two towns that are not indebted to her self-sacrificing efforts in their behalf. She had the faculty of attaching the children to her, and then through them of arousing the interest and activities of their parents. Some of her most valuable work was done in the homes.

In a word, the solution of the rural school problem is not an easy one. Its conditions are many and complex, and no single rule can be given. Among the conditions essential to a permanent adjustment will be found, first, a due appreciation of the gravity of the situation by the people most deeply concerned; second, such a change in the policy of providing school accommodations as shall secure schools of suitable size; third, such distribution of State aid as shall enable these schools to secure and retain teachers of native ability and trained skill; and fourth, an efficient supervision wisely administered.

Remarks by State Superintendent Fred Gowing, New Hampshire :—

There is a rural school problem, and there is a city school problem. The latter problem can be solved. Its solution is possible. One might quote the old music hall doggerel as applicable :

“ We don’t want to fight,  
But, by jingo, if we do,  
We’ve got the ships; we’ve got the men;  
We’ve got the money, too!”

The city has, or may have, the mechanism ; it has the men ; it has the money, and can apply these, if it will. But in the country ! The sinews of war are largely lacking. Mechanism, men, money, are not to be had for the wishing.

Supervision, training of teachers, consolidation, and the peripatetic normal class have been dealt with. The matter of revenue has not been emphasized. Of course, it is a recognized fact that in rural communités at present, beside financial difficulties, there is an inertia, an apathy to overcome, until some of us are fain to pray with the good old lady : “ O Lord, we pray that thou wilt make the indifferent diffrent !” This difficulty, arising from ignorance of possibilities, indolence, poverty, self-satisfaction, indifference, a good-enough-for-our-fathers-good-enough-for-us feeling, or from all these, complicates the problem, and is so real and considerable a factor that it must be taken into serious account by our practically working in this field of rural schools.

Are the present conditions materially different from those of former days ? In New Hampshire, as in the other

New England states, in former times there was a more even distribution of people. The congestion in cities came later. Families were large. The farmers raised their own "help." Instead of mammoth "manufacturing plants" in centres, owned and administered by foreign, rather than local, capital, there were small factories, owned, controlled, and conducted by individuals or single families, and these were passed on from father to son. The whole community took a peculiarly personal interest in the success of such enterprises. Rapid transit was unknown. Newspapers and magazines were few. People were self-reliant and independent. Industry and thrift were fundamental virtues. The population was homogeneous. Language, religion, traditions were largely the same for all. Illiterates were few, and possibly the ratio of well educated to uneducated was considerably higher than now.

Bearing directly upon the school problem, there was formerly a tendency toward culture among the poor even, a high appreciation of education. Children were taught that education was a most desirable thing, a pearl of great price, a key to success, a well-spring of happiness. Sacrifices were freely offered upon the altar of education. This one condition made the difference between an upward and a downward tendency. Consequently, the common school life of a child was prolonged, and as "prolonged infancy" has increased the power of the race, prolonged school life strengthened the child of other days. Books were few, but classic. The best scholars among the girls became "summer teachers," and college boys taught the winter terms. Enthusiasm for mental development prevailed to a great extent. Distractions

were fewer. Boys and girls "knew a thing or two," could turn their hand to "doing things," rarely got stuck in difficulties. These days were full of hardships and privation, possibly; but certain virile qualities seemed inherent in the stock.

To-day, large aggregations of population and of industries are found in a few cities and large towns. Rural towns have diminished in wealth and people. Large numbers of people, alien in tongue, traditions, institutions, and religion, have come to us as residents, whom we welcome, but who must be transformed by some agency into American citizens, thinking the thoughts of a free country, absorbing our principles. These people, too, were not pioneers subduing a stubborn soil, but are largely laborers for others. School life is shortened. In a word, the present conditions are somewhat nearly opposite to those just noted. We are not deplored, but trying to recognize and meet the change. Naturally, generalization is difficult. True it is, however, that the country has been giving of its life to the city. From these hills have gone forth the best, leaving the weaker, the more timid, the less enterprising, behind. The country-bred men and women are the leaders in the cities. The city owes a debt to the country of incalculable amount. How shall it pay it? These springs of health must be kept pure at the source. Fun and joking at the expense of the "deestruck skule" are prevalent, and I laugh, too, to keep myself from crying.

The remedy! A partial remedy lies in state aid to poorer towns. Simple gratitude would indicate that such help is righteous and beautiful. But it is the state that demands the education of the young. It is the state

that makes laws for compulsory attendance of children at school. It is the state that regulates the employment of children in manufacturing establishments. The state assumes the education of the young. The state, then, must set standards for both pupils and teachers. The state, too, must see that the standards are maintained. must assure success, must invest sufficient capital to bring desirable returns. It cannot put its hand to the plough and turn back. If any community, then, is unable, for lack of funds, to meet its necessary school expenses, the state should assist in lifting the burden, not as an act of charity done grudgingly, but as a duty and a recognition of what is fitting and gracious.

In many ways state aid may be distributed. Here is one. It will not prevail in New Hampshire this year, but in some year relief will come. The aim is to levy a mill tax or a half-mill tax throughout the whole state, and then distribute this fund in such a way that, while all shall receive back some, the larger benefit shall come to the poorer community.

Consolidation of schools is not feasible in many places. "The lay of the land" inhibits this. Some of our towns are like the Vermont town where the three-legged milkstool was invented because there was no room for the fourth leg. In these towns a comparatively large number of schools must be maintained, and many teachers in comparison with the number of pupils must be employed.

Let us divide the fund into two parts and distribute one-half among all the towns and cities in proportion to the number of teachers employed. Herein the larger places will help the smaller.

It is of advantage not only to get pupils into the schools, but to keep them in. The other half of the fund may be distributed in proportion to the attendance of the pupils for the year preceding the distribution. The New Hampshire literary fund, a very uncertain quantity, is distributed in proportion to the number of children attending schools two weeks or more. There are objections to this plan, but they will be found to be superficial largely. It is a much better plan than any now existing in this state and many states. That our strength may continue to come from the hills, let us aid in sending back to the hills somewhat of our acquired wealth.

Remarks by Dr. C. C. Rounds, Plymouth (N. H.) Normal School :

The rural school problem we seem fated to have always with us, and throughout the country it remains essentially the same. Here one attempt has been made at its solution, and there another, but these attempts have rarely been made from any comprehensive view of the conditions essential to a complete reform. In educational conventions or discussions it is seldom that the rural school has had directly a voice. Cities and the larger towns have gone on improving their schools as concentration of wealth and of intelligence have made such improvement possible, while in many cases the rural school of to-day meets the demand of its time less efficiently than did the school of a generation ago; consequently the differences in culture between city and country have widened, and these differences in educational conditions and possibilities are among the chief causes of the decadence of the country town.

The statement, "as is the teacher so is the school," has a large measure of truth, yet the best teacher may be handicapped by unfavorable conditions. Nevertheless, the first necessity is for good teachers. How shall these be obtained? Although the normal school has been doing its work for more than a half century, and has done it well, but a very small proportion of the rural schools have trained teachers. Were the school year as long, the salary of the teacher as large, the other conditions as favorable in the school of the country as in that of the town, the case would be different; but to wait for all these changes is to sacrifice another generation. As conditions now are, we can no more expect graduates from complete courses in the normal schools to give their lives to the rural schools than we can expect graduates from four-year courses in the agricultural colleges to settle down on New England farms.

These facts are well known, and various attempts have been made to meet them. There is the teachers' institute of one, two, or three days. These give a certain amount of inspiration. Illumination is needed. There is the summer school of two or three weeks. This accomplishes more, but its influence, too brief at the best, reaches but few of the vast number that need its uplifting. In the West the summer normal institute of four to six weeks, specially planned for the country school teacher, carries the work further, and as the time is lengthened more definite good will result. Yet this is not enough by far. An agency is needed intermediate between the brief convention or institute and the normal school, with its two or four years' course, so far beyond the reach of the majority of rural school teachers. What shall it be?

Several facts must be kept in mind in the solution of the problem: 1. A large proportion of the teachers of rural schools cannot afford the time and expense of a two years' course in a normal school. 2. The receipts from employment in the rural school under present conditions do not remunerate one for the expense of a normal school course. This is a simple matter of business, and sentiment will not change the facts. 3. Other conditions remaining the same, the attendance at a school is at an inverse ratio to the distance between school and home. This is especially true for a short course.

To meet these conditions there is needed a normal training school with a short course of one-half year, the usual length of one term at the existing state normal schools. If the mountain will not come to Mahomet, Mahomet must go to the mountain. This should be a normal school on wheels,—one-half year in one place, then changing to another. The place, a village which will give over its schools to this normal training school for the term for model and practice schools. All attempts to prepare teachers for the work of the school room without training in teaching is a delusion and a snare. These training schools, organized as primary schools in one room and as grammar schools in another, will show and teach what can be done with schools in the simplest form of gradation. All the grades should be, for a part of the course, brought together to illustrate the work of the one-teacher school, such work as in the ungraded school can and should be done. Such a school would have its regular faculty of two or three teachers, whose work would extend through a complete school year.

This the general organization—what the work? Simple treatment of matter essential to good teaching would be grounded on the simple principles of psychology and ethics. Not attempting to sound the depths of philosophy, essentials may be taught and comprehended, and teaching thus grounded upon fundamental truths of human experience may come into the spirit and method of Him who taught as one having authority, and not as the scribes. Deficiencies in education would be supplemented by sound teaching; principles of teaching and of school management would be taught and illustrated. Many might learn to do well what they had never done at all; most would learn to do better what they had done poorly. From these schools would come many students for fuller courses of training and a wider usefulness.

Some work of this kind must be done. A larger and richer country life must be made possible. Country and city conjoined make up the nation, and though mutually dependent, there is a large measure of truth in a recent statement, "burn the city and leave the country, and the city will be rebuilt; destroy the country, and the city must perish."

From country to town the tide of humanity is constantly flowing as rivers flow to the sea. The ancient Russians held it highly criminal to pollute the waters; we poison the stream from source to mouth. Let us take good care that this other stream flow as strong and pure as human agency can make it.

The better teacher in the rural school will call for a larger school and better conditions of organization, equipment, and supervision, and all these will call for more

money. This additional burden must not be laid upon the country town. Often these towns tax themselves to sustain poor schools fourfold what the city finds necessary for its complete system. A higher tax would drive all movable capital from the town, and thus complete its ruin. We have passed from the district to the town as the smallest unit of organization and administration. The state must become in larger measure than now the unit for support ; there must be a wider assertion of the principle that the property of the state must be held for the education of the children of the state. Not only on broad, humanistic grounds, but on grounds of political expediency, we are all in a sense the keeper, not only of our brothers, but of our brothers' children.

What shall we pass on to the next generation? Not merely our wit and literature, not merely accumulations of wealth, but the boys and girls of to-day, the men and women who will make the America of the twentieth century. According to the character of this product of our time must the nation rise or fall. Journeying through the wide extent of our undeveloped country and noting the immense expanse over which the forces of sun and air are still at play, the undeveloped forces still latent in the soil, waterfalls still content with beauty, the imagination in vain tries to grasp the boundless possibilities of the future. The loss and waste from failure to educate is greater, beyond all comparison greater, than these ; for this loss is a failure to develop centres of spiritual forces which underlie, which organize, direct, and control all else. "The average intellect of the present day is not equal to the problems presented to it." The vast majority of the people do not rise above the condition

of intellectual mediocrity. When we note in any department of effort what one strong, well-trained mind has contributed to the life and thought and action of its time, what a centre of force it has become, what permanent contribution it has made to the resources of humanity, and compare this with the vast procession that merely moves on through its allotted course, and leaves no sign, we may appreciate the work which must be done, and done *now*.

## V.

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### **SOME NEW EDUCATIONAL PROBLEMS.**

BY **GEORGE I. ALDRICH, SUPERINTENDENT OF SCHOOLS,  
NEWTON, MASS.**

During several recent years there has been going on a discussion of great interest and importance. The subject matter of this discussion is commonly spoken of as "The Enrichment of the Grammar School Program." While such discussion has been widespread, it has undoubtedly been more eager and intense in some parts of the country than in others. The facts seem to warrant the statement that Boston is, on the whole, the storm centre of this educational unrest. Herbert Spencer points out three phases through which human opinion passes. There is first, he says, the "unanimity of the ignorant"; then "the disagreement of the inquiring"; and finally "the unanimity of the wise." In the discussion to which I have referred the third stage has been reached. Difference of opinion in regard to particulars still exists, but a consensus of opinion as to the broad essentials has been reached. As yet, such consensus includes the opinions of those only who are most competent to reach an enlightened conclusion. Measured by numbers, it is the consensus of an insignificant minority; measured by weight, it is the consensus of those who will, in the end, determine public opinion in general. It is my purpose, in this paper, to

call attention to certain of the problems which press for solution, as a result of the attempt to enrich the programs of elementary schools. Some of these problems are literally new: others are old, but have now assumed so important and urgent an aspect as to justify their consideration by a speaker who professes to be dealing with new educational problems. When we assemble in institute and convention for the discussion of educational topics, there are times when we may properly proceed with slight regard to limitations. Free, for the hour, from the restrictions put upon us by lack of money, an inadequate teaching staff, or unenlightened opinion, we wisely carry on our discussions as though such restrictions did not exist. We occupy ourselves with ideals; we strive to determine the best things to be accomplished. So doing, we act wisely. It may be long before our plans are realized. Very likely they will never be completely realized. Nevertheless it is a sorry outlook for progress in education, when, dismayed by the obstacles which confront us, we rigidly restrict our educational projects by over anxious regard for such obstacles. Assembled in convention and institute, let us plan, aspire, even dream if you will, and then go forth from such meetings, filled with zeal, determined to overcome the barriers which stand between us and the realization of our ideals. Leaving the hall of educational discussion, once on the field of educational practice, we shall find ourselves in need of the amplest stores of patience, persistence and undaunted courage. To equip us for victory on the educational battlefield is the province of such an assembly as this.

Very briefly stated, enrichment of the grammar school program comprises the following modifications of the

existing curriculum. First: instruction in mathematics is no longer to be restricted to arithmetic, but algebra and geometry are to be taught. Second: instruction in language, hitherto limited to the mother tongue, is to be enlarged by instruction in French or German, or Latin or possibly in two of them. Third: nature study, now found chiefly in pretentious courses of study, is to be incorporated as an integral portion of the life of the schools. It is evident that these modifications are of the most radical and far reaching character. Compared with any previous changes in American schools, they may fairly be termed revolutionary. The attempt to bring about these changes confronts us with numerous problems; some more difficult of solution than others, but all sufficiently perplexing. Of a few of the most important, it is my purpose to speak.

However we may differ on other points, I assume that on one we are agreed. Whatever be the changes in the schools which the future holds in store, we all wish to see them brought about with the least possible friction and waste. I have spoken of the proposed changes as revolutionary and such they seem to me. But if revolutionary in their character, may they not be evolutionary in the process of coming about? The distinction is happily stated by Prof. Richard T. Ely, who says:

“A change that takes place gradually so that life adjusts itself to the new conditions easily and no great loss or suffering results, a change like that which takes place in the plant which is always growing while it seems to be at a stand still. Such a change we call a development or *evolution*. But a change that comes so fast

that life cannot adjust itself to the new conditions, a change which breaks down the old order with much confusion and suffering—this we call a *revolution*." We frequently lament the conservatism which so often seems to us a useless brake on the wheels of educational progress. Such conservatism serves a good purpose in safeguarding the valuable accumulations of the past. Upon it we may confidently rely to make the process of enriching elementary programs evolutionary and not revolutionary in its character.

By the term "problem" we mean a question proposed for solution. As fundamental among all which might be proposed at this hour, I throw forward the following. How is public opinion to be molded so that it will not merely permit, but cordially approve and sustain the changes advocated by what is as yet a small minority? Evidently, if this problem can be solved, sundry others—likely enough under different circumstances to cause trouble—will be disposed of easily. By way of illustration, let me suggest that grammar school enrichment as advocated, involves more and intenser study on the part of pupils; involves a larger number of teachers; involves qualifications far superior to those possessed by teachers now in service; and finally involves the expenditure of larger sums of money for public education. These last are problems which—otherwise impossible of solution—will yield readily to our efforts, if first we can solve the problem just referred to as fundamental. Let us take Germany or France as countries having school systems wherein authority in educational matters is highly centralized. The minister of Public Instruction in Paris, aided by the advice of a staff of educational

experts, determine what French boys and girls ought to do at school. Having so determined, he is not left after the American fashion to advise, or suggest, or recommend that those things which are desirable be done. He is clothed with power. He may say, "Thou shalt" and the desirable thing comes to pass. What the French public may think is of comparatively little importance. In America, it is far otherwise. We have no national system of education. In Washington, you may find a minister for agriculture, but no minister for education. From this we are not to conclude that Americans put a higher estimate on the culture of cabbages, cucumbers and carrots than on the culture of children, but we are forced to conclude that France has a bit of administrative machinery for effecting changes in its schools which we lack. Neither have we, in New England, at least, any state system of schools. In some of the middle and western states may be detected a slight approach to centralization of administrations, but in Yankee land we have the principle of educational local option in all its glorious freedom. In Massachusetts, for example, the Public Statutes do in a measure prescribe the powers and duties of school committees, but they leave these officials with a large measure of discretion. To some extent the statutes determine the branches which shall be taught in the schools, but these prescriptions may be regarded as the minimum requirements. The state says in substance to the people of a town or city, certain branches must be taught in your schools, certain other branches may be taught if your School Board deem it advisable, but it does not negative the teaching of still other branches.

Furthermore, the statutes themselves may be amended by the representatives of the people, assembled in legislature, in any manner, and to any extent, not prohibited by the constitution of the state. Evidently then New England schools are a reflex of prevailing popular opinion. In the long run the schools will be as good as the people demand, or as poor as they will tolerate. In them will be found embodied the prevailing ideals as to what constitutes a good education. But who make public opinion—is it the ninety-five of every hundred, or the one of light and leading and the four who sympathize with him? For the hour it may be the ninety-five, but for the decade it is the five. The fact is that, in the end, even a democracy is ruled by the saving remnant, and not by the majority. A failure to realize this accounts for the pessimistic mood which too frequently takes possession of us. We contemplate the weight of indifference or ignorance arrayed against us, and despair of accomplishing that which we see to be highly desirable. While, however, there is no occasion for despair, it would be foolish indeed to blind our eyes to the magnitude of the undertaking. Perhaps nothing is more characteristic of our educational policy than the fits and starts which pertain to it; its spasmodic leaps in one direction or another, succeeded by a gradual settling back to the point from which the leap was made. These movements may usually be explained by the presence of an individual—sometimes a supervisor, sometimes a member of the school board, possessed of ideas and a determination to carry them into effect. What I wish to bring out is this: Nothing is finally settled until the public, with substantial unanimity, has approved the set-

tlement. Now what are the facts as to grammar school enrichment? I have already claimed a consensus of opinion on the part of a minority—a saving remnant. But others are to be reckoned with. In June, 1894, the school board of Newton determined to offer Latin as an elective to pupils of certain grammar classes. A circular was sent to the guardian of each pupil asking him to indicate whether he wished his ward to take up the study. From one such guardian came this response:

“I am not in line with some of the new notions concerning our public schools. I am sorry, for I dislike to criticise what many good men believe to be for the best interests of our children. My fear is that we are making a mistake in our radical changes.

Theoretically a change may seem to be an improvement. But experience frequently shows that theories are not practical.

My own notion is that while so few of our grammar school scholars enter the high school, it would be better to give them more of the practical business elements; make them good penmen, good arithmeticians, good spellers, good readers, good grammarians, and good in geography, history and book-keeping.

In my thirty years of business life I have employed many hundreds of people. The most valuable people have been those who were the most advanced in the above named departments, rather than linguists, physicists and theorists; and for an all-round, every day education, my idea is that these rudimentary studies, well adhered to, are the most profitable.

Hence I regret that my boys cannot be taught more to my liking in the public schools of Newton.”

Here we have stated in vigorous language the prevailing New England conception of common school education. It is a conception which has been growing and strengthening since the fathers established their first school. You and I may regard it as narrow, illiberal, inadequate. The ninety-five do not so regard it, and, until they do, we shall lack sufficient support for the innovations recommended by the five. Thus summarily I have stated what seems to me the toughest of our new educational problems. What as to its solution? Much after the spirit of Portia, who says: "I can easier teach twenty what were good to be done, than be one of the twenty to follow mine own teaching," I must admit that it is easier to propound problems than to set forth their solutions, and I should transcend the reasonable limits of the occasion in attempting both. As a wise teacher says to his puzzled pupil: "Read your problem, my boy, read it over and over again," and thus doing gives the pupil a key to its solution, so I shall hope to render some slight service if I succeed in bringing into clear relief the larger problems which confront the educational fraternity. Two suggestions, however, I offer as to the solution of this first problem—this problem, which asks how shall the dominating New England or American ideal of public school education be changed so as to conform to the higher and broader ideal of the enlightened?

First then it is the duty and the privilege of the most competent among us to impress their views upon the general public. This should be done, as opportunity offers, in oral discussion, in the newspaper, and on the pages of the periodical. Let me go a step further and

say that, if opportunities do not offer, we should create opportunities. I fear that the school men and women of this country are not sufficiently aggressive. Much of the language which we address in speech and writing to one another ought to be addressed to the public. He who publishes a good article in the Educational Review does well, but he who publishes in the Forum, the North American Review, Harper's or the Century does far better. It is likely that eight of every ten readers of the Review are already of the same mind as the writer, while a like proportion of the readers of the general publications are in need of conversion. "They that are well need not a physician, but they that be sick."

Next I suggest that a large portion of the general public lack time to follow theoretical discussions—possibly have no fitness therefor. They read neither the Forum nor the North American, but they have children in the schools. It is necessary then that the more fortunate towns and cities set about the innovations which I assume for the moment to be wise. In using the terms 'more fortunate,' I refer to communities able to give their schools a generous financial support, and served by school boards, possessing the general confidence to an extent which enables them to anticipate considerably the march of public opinion.

We have communities which should be the leaders in educational reforms. A certain degree of hazard, a certain margin of waste, attends the first attempts at reform, and both the risk and the waste can be better met by these more fortunate communities. To the extent that the children of the class just referred to—the class inaccessible to ideas—are found in these schools, so far

will the innovations, if intrinsically wise and skilfully carried out, be effective in molding public opinion. Many a man, having neither time, ability nor disposition to inquire further, knows that his boy is "getting on" well at school. He sees the lad absorbed in his work—enthusiastic over it—fired with ambition, and the father forthwith becomes an ardent supporter of the policy which has produced these results. Here I must suggest that mention of more fortunate communities implies the existence of others which are less so. It may be lack of means which renders it inexpedient for the time that these latter places should attempt what their neighbors are doing. The school officials for the time may have neither breadth nor depth of conviction. If so, they are likely, at the first appearance of opposition, to beat a hasty retreat from the advanced position which they have occupied, and so, in that community, any permanent measure of reform is rendered doubly difficult. Its last condition is worse than its first. This word of caution seems to me quite opportune. Some of our brethren, desirous of being regarded as wide-awake, progressive educators, are disposed to advocate measures which their circumstances do not warrant. We rarely find a school system in which the teaching staff is equal to the demands laid upon it. Is it wise to ask a corps of teachers, already overburdened, to undertake additional tasks? Is it not wiser to do a few things well than many things shabbily? Will not the cause of progress in education, the cause of educational reform, be advanced by a wise restraint on the part of school officers whose circumstances dictate such restraint? The problems with which we are concerned fall naturally into two classes

The first class consists of problems of a general or popular sort, i. e., of problems with which laymen are immediately and properly concerned; of problems for whose solution we are largely dependent on laymen. Most of our time to this point has been given to the hardest problem of this class, viz., How shall the public be led to a hearty belief in the wisdom of the proposed grammar school enrichment? Once we solve this problem, sundry minor ones, as already suggested, will cause comparatively little trouble. How to obtain more numerous teachers? how to obtain abler and more cultured teachers? how to obtain the larger grants of money, which will inevitably be necessary? these are problems whose solution will follow close upon the solution of the greater problem which has been considered at some length. But there is a second class of problems, comprising those of a professional character, as opposed to a general or popular character. With these latter problems laymen have no particular concern. Inasmuch as the layman's children may be affected by the right solution of these problems, he is properly interested in them. I am interested in the deliberations of a company of physicians who have come together to determine the wisest treatment for my child. My interest in their deliberations is natural, inevitable: but it does not make me competent to take part in them. Between interest and competency there is no connection. So in this second class of problems—the layman has a natural interest, but no competency which entitles him to an opinion. In a recent newspaper issue my eye fell upon the account of a hearing given by the school board of a New England town upon the merits of a certain system of

teaching reading. The board was asked to state whether a canvass of the town had been made with the purpose of learning the feelings of the parents in regard to the system in question.

Imagine, if you can, the sensation which would be caused at a similar meeting in Germany if it should there be suggested that the way to determine the soundness of a method of teaching reading; the way to decide upon its retention or rejection was by consulting the *feelings* of parents. As examples of this class of professional problems—problems to be solved by educationists and not by laymen—I cite the following: Shall algebra and geometry, in grammar schools, be taught synchronically? If not, which shall precede? If Latin and French are to be taught, shall the ancient or the modern language come first? Shall instruction in these new comers to the grammar school be given by the regular staff, or shall peripatetic teachers be employed? Shall these studies be required of all pupils? If not, to what extent shall the elective principle be applied? If the elective principle take effect, shall pupils electing do all the work in other branches required of those who do not elect? Shall the boy who elects Latin, for example, receive precisely the same training in English grammar given to his neighbor who does not elect Latin? These, so far as New England common schools are concerned, are literally new educational problems. As I have already remarked, there are other problems, not absolutely new, which have now become of so urgent a character as to demand immediate attention. The subject of departmental instruction illustrates what I have in mind. Before grammar school enrichment was much thought

of, the advisability of this form of instruction had been frequently debated, and it had, not infrequently, been made a matter of experiment. Aforetime, however, our interest in the question was almost wholly academic. The schools could go on very comfortably whether class room instruction or departmental instruction was the prevailing policy. But now, as I see it, this matter is no longer one of mere theoretic interest. Time does not permit me to recite the reasons on which the conclusion is founded, but we cannot, in my judgment, escape the conclusion that the enlarged and enriched program can only be carried out by the application of departmental instruction.

There yet remains for brief consideration the most difficult of the professional problems which confront us. In one aspect it is of the popular order, i. e., involving successful appeal to the public for its solution. It is far older than departmental instruction. Certainly for more than fifty years leading writers on educational themes have been pleading for a recognition of the claims of nature study. Of course the only recognition of value consists in the incorporation of nature study with the very life of the schools. Appreciating what has thus far been accomplished, the facts compel us to admit that only the faintest beginning has thus far been made. We have here a forcible illustration of the reform to be effected in public opinion.

The average American believes that his boy ought certainly to be taught to spell "parallelopipedon," but whether he is taught to distinguish mullein from mignonette is of small importance. The latter is an extra. If there is time to attend to it, after the branches characterized as

"practical" "essential" "fundamental" are attended to, well and good. So thinks the average citizen, and so too thinks the average teacher. Now I have no quarrel with reading, writing, and ciphering. So far as we can see, they must always be taught, and they ought to be taught thoroughly well. We are not to excuse poor results in these branches, because of a claim that pupils have been giving time and effort to other pursuits. But after all these are but humble school arts—the scholar's tools—of vast importance certainly, but not constituting an education, even as measured by a common school course. If I am not in error then, the introduction of nature study is by far the most difficult of the proposed enrichments. You will accept as axiomatic the statement that the character and the value of the results in any study depend chiefly upon the character of the teaching. To secure good teaching in algebra and geometry is an easy matter. The same thing may be said of Latin, and, with less confidence, may be said of French and German. When we consider nature study the case is far otherwise. It is not impossible to find good teachers of natural science for secondary schools. In such schools, as we well know, our trouble is that pupils must begin with the veriest a—b—c of each science, with faculties wholly untrained, and themselves wholly lacking the scientific spirit. We are concerned with elementary schools and here the difficulties are tremendous. With notable exceptions here and there—lights which seem to make the surrounding darkness more palpable—these schools are in the hands of a generation whose early training was almost wholly literary. The statement might be unqualified so far as it relates to our training before reaching the high

school. In the latter school and in the college, it too often happened that geology and chemistry were as truly literary studies, as were Latin and rhetoric. While frankly admitting the monumental difficulty of this last problem, I am far from regarding it as insoluble. No advantage ensues, however, from underestimating the strength of an opponent. It is well to realize then that we enlist in no holiday campaign when we attempt to make nature study bear the same vital relation to the intellectual life of pupils and teachers which geography, history, grammar and arithmetic now bear. If I have succeeded at all in the foregoing pages, enough has been said to make it clearly evident that, in the prevailing unrest of the common school world, we are confronted with problems neither few nor easy. In what spirit shall they be met? Let it be with high hope and undaunted courage. A Bourbon in politics is one "who learns nothing, and forgets nothing." Certainly we never lack Bourbons in education: doubtless they serve a useful purpose but let us not be of the number. Let us rather say with Matthew Arnold—that "in a science dealing with so subtle elements as those of human nature, it is only possible to answer for the final truth of principles, not for the direct success of plans; and that, in the best of these last, what can be immediately accomplished, is always questionable and what can be finally accomplished, inconceivable." Finally: one other problem there is, old and yet ever new. Pestalozzi long ago affirmed that each human being is entitled to the fullest possible development of the faculties with which he is born. It is easy to overrate the importance of educational machinery: we may expect too much from modernized curricula. As public school education

increases in complexity it is more and more difficult to preserve our bearings. Amid the complicated educational machinery and the modernized curricula, it is vastly easy to mistake means for ends. Whether pupils study algebra or French or Latin is comparatively unimportant; whether they secure that which Pestalozzi declared to be their due is the vital question. How to secure this result is the great educational problem of all time.

#### DISCUSSION.

Remarks by Thomas M. Balliet, Ph. D., Superintendent of Schools, Springfield, Mass.:

In this discussion I shall try to supplement the paper just read rather than to speak on the points of the paper which have been presented so clearly that further discussion could add but little of importance.

One of the new problems which confront us at the very threshold of our work is, it seems to me, that of determining the nascent periods in the developement of the growing mind. No course of study can be intelligently made until after this is accomplished. Much has been done in this direction, but a great deal remains to be done. A course of study should be so constructed that everything be taught at the period at which the growing mind feels the deepest interest in it. Our work is, no doubt, at present ineffective because we teach some things too early and other things too late.

Another new problem is that of nature study. Nature study is not the same thing as natural science or natural history. Its aim should be to bring the child into sympathetic, loving relation with nature. It ought to begin

by introducing the child to living plants and animals as friends. At present we make the work on this subject too scientific.

A third problem which occurs to me is that of moral training. It is a new problem with regard to a very old subject. At present we are depending too much on special instruction in morals. Many people even confound moral with religious education. We often speak of "purely intellectual training," and of moral training as a thing totally separate from it. We have yet to learn that moral training must come mainly through intellectual training, and that there is no genuine intellectual education which does not make effectively for right living. Modern psychology teaches us that thought and will are at bottom the same thing. Thought is repressed action, and volition is simply thought issuing in deed. All thought is motor and tends to action if not inhibited.

All knowledge must be co-ordinated and related. When so co-ordinated and related, it not only becomes intellectual "power," but it also leads to right motives, foresees consequences and controls conduct. How to teach every subject of the curriculum in such a way that the knowledge gained will lead to right conduct, is the new problem. Herbart saw this problem clearly and made the most important contribution to its solution that has yet been made. So far the only material advance we have made has been to go back to Herbart. The present interest in Herbartianism is full of promise, looked at as a beginning; looked at as an end, it is full of danger. We shall not reach a solution unless we go beyond Herbart and bring to bear upon the problem the many side lights of modern psychology, anthropology,

and what is known by the modest name to-day of "Child Study."

Reference, ought, perhaps, to be made in this connection to the great problem of putting what is called "higher education" on a pedagogical basis. This is a problem so new that it is not even recognized yet by the majority of our teachers in the colleges. We all recognize the fact that in elementary schools special pedagogical training is required in a teacher. We are beginning to recognize that in secondary schools the teaching can not be effectively done by a teacher who knows only his subject and is ignorant of the science and art of teaching. We do not yet recognize that the teaching in our colleges must be equally ineffective, if the teacher has had no training in the science of education and in the art of teaching. There is far more poor, ineffective teaching done to-day in our colleges than in our best elementary and secondary schools. The main weakness of the teaching in the best elementary schools is lack of scholarship; the chief weakness in the teaching in our colleges is ignorance of the first principles of education and of the very elements of the art of teaching. The teaching even in our best colleges could easily be made from twenty-five to fifty per cent. more effective, if every candidate for a position were required to know, besides the subject which he proposes to teach, also the science and art of education.

Lastly, I may briefly refer to a problem which will press for solution in our country before a great many years. It is the problem of the inevitable readjustment of higher education. The secondary schools are extending their courses from year to year. The universi-

ty courses are gradually lengthened. The colleges are doing strictly college work during the first two years of their undergraduate courses, and attempt to do university work during the last two years. Most of them are poorly equipped to do university work. It is a question whether this university work had not better be relegated to the universities, and the work of the first two years of the college be added to the course of the secondary school. The secondary school would then fit directly for the university, as it does now in Germany. This re-adjustment therefore involves the question of the very existence of the college.

One of two things must surely come within the next twenty-five years ; either the standard of admission to our best colleges must be considerably lowered and the colleges must adhere to strictly collegiate work, or the college must drop out and the secondary school must raise its standard to enable it to fit directly for the university. The conditions which will determine the solution of this problem are complex, and no one can forecast how it will be solved ; but it seems to me likely that the broadest interests of education, both elementary and higher, would be served best, if secondary and higher education in our country would be gradually so reorganized as to enable the secondary schools to connect directly with the universities, as they now do with the higher technical schools.

## VI.

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### THE TRAINING OF TEACHERS FOR SECONDARY SCHOOLS.

BY WALTER BALLOU JACOBS, ASSOCIATE PROFESSOR OF  
PEDAGOGY, BROWN UNIVERSITY.

Man making is the most divine of all arts. When we consider how old an art the art of teaching is, we are surprised that the idea of special training for teachers is of so comparatively recent a birth. Its growth and progress finally, if not its birth, has been due to a changed conception of life and its possibilities, and hence a wonderful increase in the respect in which education is held; a strengthening of faith in its efficacy to give greater happiness and a higher life to the individual and the race. It is only within the memory of men of our own generation that the static conception of life, which held sway for so many centuries, has given way to the dynamic conception. This change has formulated itself in emphasizing the idea of development as applied to the life of the individual, and the idea of evolution as applied to life in its entirety.

The relation of man's life to that of the mere animal has always interested thoughtful minds, and presented a problem which clamored for solution. First came the poet's myth. Prometheus, having fashioned man in mortal image, found in the sun the divine gift which

should link the mortal with the immortal, the human with the divine. Thus, by the use of fire, man was at once linked to God and differentiated from other animals. After the poet came the logician and philosopher with his word juggling, seeking to shake out of the concept man the quality which made him man, and saved him from being beast; and Plato's featherless biped was the butt for the sarcastic jokes of Athens. Both of these were solutions founded on the static view. Finally came the scientist, and in particular the biologist, hatching eggs in his incubator and studying embryos, deftly fitting all nature,—man, animal and plant,—into the all-containing category of evolution. This dynamic solution of the problem has gained so strong a scientific foundation and such a distinctness of detail, or at least so rich a promise of distinctness, that the generation has staked its faith upon it, and given it a Roman numeral in its *Credo*. The biologist tells us: Man is more than beast, because he possesses the faculty of developing infinitely beyond the beast.

This idea of development, this dynamic solution of life, has entered into thought on education and revolutionized it. The mere concept of development, as applied only to the lifetime of an individual, was not a new one in the field of education. Any simpleton who has lived a score of years can see that he has developed. Many thinkers had shown that infancy, youth and manhood are related organically, but it was the relating of individual development to generations and aeons of the past, and later the discovery that the individual in his own development strides in haste through the race-stages of growth, that gave to the idea of development a

new lease of life,—an immortality, perhaps. Certainly as an all-embracing concept, it stands to-day without a rival. The development of the individual, seen in the light of race development, gained an importance in possibility not dreamed of before, and gives to education as a moulding and forming of men a recognition which education, as the mere imparting of information, had never, and could never, attain. Education has passed from memory-cramming into man-making, and the teacher has passed from a drill-master into a Prometheus, a maker of men; from a day laborer into an artist. It becomes more and more evident that to do his work well demands special skill and careful preparation.

At the same time as the deepening of the meaning of education for the individual has been popularizing itself, the realization of the breadth of the influence of education has been expanding in equal degree. The possibilities of education have come to be looked upon, not as the making of men alone, but as the making and defense of nations, and the sure means of social progress. Germany and France have both learned by bitter experience that an educated people is as essential to success as a standing army, and the rest of the civilized world has not been slow to profit by their experience. The social reformer also has cast his eye upon the schoolhouse, and would fly from its flagstaff not the nation's flag alone, but the flag of all social progress. Such, then, the world to-day conceives to be the possibilities of the teacher—a maker of men, a defender of nations, a builder of society.

Can any one question whether the man who is to hold such a place needs special preparation for his work? He

who denies it must confess that by his very denial he condemns education itself. No man can consistently assert his faith in education as a power to make better men, better citizens, better physicians, better lawyers, better clergymen, and deny its power to make better teachers. Any reasonable conception of education carries this in itself as the plainest of corollaries. It is the low conception of education, as mere memory packing, that has blinded men so long to the logical necessity of the conclusion, and he who opposes the onward march of this corollary, or limits it to one class of teachers, or points to the meagre results already attained, cannot have read aright the page of history ; cannot be aware how irresistibly an idea, once accepted by a people, is worked out to its logical conclusions, through all opposition, though it take generations to do it. Its long delay in this instance may be a case of blacksmiths' horses and shoemakers' wives, but come it will and come it must. *How* it shall be done, that is the *x* of the problem ; not whether it shall be done or no.

If the very idea of education when carried to its logical conclusion makes the attempt to train teachers imperative, the demands exposed by experience have made the conviction doubly sure. The history of the attempts to satisfy these demands runs parallel with the development of the conception of education itself. It began with cramming the mind with knowledge which was directly to be crammed into the mind of another. A most flagrant case is the monitorial system, that flourished in England at one time. And from this, as education has developed into a science and an art, there has come more and more of technical training until at last we seem

to be emerging from the fog of indecision as to what the training of a teacher, as such, should be, and to be ready to assert at all events what it is not :—that it is not the imparting of knowledge, which is in turn to be imparted to the child, but that the candidate must bring this knowledge with him when he begins his training. This problem is one, the solution of which the normal schools are fast working out. There is no question what the result will eventually be. The high school is not a normal school, and the normal school must not be a high school. Despite all this groping and failure to reach the standard, the necessity for training teachers for grammar and primary schools is recognized by all. Unfortunately it is not so recognized in the case of the high school and college. Here the old conception that any one is fitted to teach if he knows his subject: that knowledge makes the teacher is intrenched in its strongest fastness. The public who have been wont to bow with deep respect to the college graduate, and with only indifference to this same college graduate, tyrant of a crew of boys and girls, is apathetic and unobserving. The mass of high school teachers, never having known the benefit of a special training themselves, never having themselves been able, unaided, to shake off the mere knowledge cramming conception of education, look with coldness or indifference upon this innovation which threatens to revolutionize their empiric reign; but the logical necessity of the purpose, the analogy of the lower schools, the example of Germany and France, far ahead in this regard, are fast destroying the conception that mere knowledge alone, however abundant it may be, makes a good teacher. And our high schools, not many years hence, will refuse to accept untrained teachers.

Let us for a moment consider the work of the secondary school and observe if, while teachers are trained for other schools, the secondary school has any special ground for exemption. Let us examine it in the light of that highest conception of education, which contains, in itself in unity, both knowledge and development. The high school period of the life of the child falls usually between the fourteenth and the eighteenth years of age. There is no period of development in the life of the child, save that of the first few years, which can for a moment compare with this in meaning for the child. It is the second birth. It is the birth of the *ego*. The emotions just now transient, coming and going like summer showers, become full and persistent, welling up from a depth of the soul unknown to the child before. They begin their amalgamation into a character. The child, before supple, pliant, yielding easily in judgment, even though rebellious in act, demands for himself the right of judging. Body and mind alike show awkward and unexpected fits of growth. As the babe in the cradle explores his limbs and reaches for his toes, and crows to find them his, and by the senses unites himself in all his parts into a body corporate, so now the youth explores himself in his intellectual and moral nature. He never knew before that there was as much of him as there really is. He is awkward in his new possessions, self-conscious, abashed. His brain fails to co-ordinate his muscles as it was wont a few years ago. He cannot walk, he cannot speak, he cannot think, without walking, speaking and thinking being conscious walking, speaking and thinking. How shall he do this? Why shall he do that? No such question ever came to him.

before. It is the age when life begins to make its great decisions. That face so smooth and childlike now begins to be marked with the hieroglyphics of character. Hercules is at the cross-roads. Who shall help him to decide? This is the time when the self-centering thought of the child turns to altruism. He yearns to sacrifice himself for something true, something noble, something grand. Life reaches out to the stars for him. He sees himself walk the milky-way of greatness with the gods. He never will value his life more highly than now; never will be more ready to sacrifice it to nobility and truth than now.

Who is the man who shall guide this fiery untamed spirit? Who shall watch the opportunity, which once passed shall be gone forever? Shall he be a quack, an empiric? whose empiricism even has had the growth of only a few years. Or shall he be a man whose mind is stored with all that the generations have learned as to life and its growth, whose eye is quick to see the expected opportunity for which it is ever watching; quick to see, ready to act; an expert trained by careful training? Now is your opportunity if you would be men makers.

In this architecture of man the work done by the secondary school must of necessity be divided among specialists. It is often maintained that more specialization than is now employed can be introduced into the grammar grades with profit. As the scholar advances in knowledge the shortness of human life and the limitations of the human mind forbid that one man should be a teacher in many branches of learning. Now the stone cutter can hew out the keystone for a portal, and never know where that portal is to be; whether beneath it a

devout people is to pass to worship at the hour of prayer, or it is to look down upon men hurrying for gain into a mart of trade, and yet it may be a perfect keystone, well hewn, exactly fitting in its place, and fulfilling the plan of the master builder. A man may cut with precision the delicate teeth of a watch wheel. With his eye upon the pattern he may never err. And when his wheel is fitted with the wheels made by other hands, there may result the marvelous harmony of the exact watch. With man-building in the schools it is not so. The teacher must have a broad view of the whole in the light of which he shall do his special work. Else the whole work must be in the dark, and alas ! a thing of darkness. In this darkness we have built men with all sorts of deformities ; men whose lives will always be narrow, running upon close set narrow grooves ; without radiating lines, or even broad parallels of thought ; stiff-necked men who cannot turn their heads to right or left without a mental revolution ; men who never know that the horizon is a circle and melts into itself at either end ; men who with a queer penetrating roll of the eye-ball see only Latin grammar paradigms or can only count the petals of a rose ; see only its mathematics, and be blind to its beauty ; or men with mathematical eyes, and language eyes, and science eyes, instead of men with eyes of deepest depths in which all God's universe may be reflected. The highest education is a matter of establishing relations. That teacher who has never viewed the whole can ill help to spin these cobweb threads of relations, finer than the microscopic nerve tracts lost in the labyrinth of the brain. Correlate ! How can he correlate who has never dreamed of such an art ? Man-building ! How can he build a man who has

never bent his brow, perhaps for a single hour, over the problem of what a man should be, and how he can be made to become what he should become.

But the secondary school not only requires teachers who view widely the ends of education, rising in a hierarchy to that highest architectonic end—moral character, but it requires teachers who are fully conversant with the methods and spirit of the schools below the high school. As long as education was likened by simile to the erection of a stately building, where the higher simply rests upon the lower, the necessity of this knowledge was obscured. But when we take the true figure, that of a growing organism, when we recognize that development comes only by the expansion of the old ; that the new is only acquired by being organically connected with the old, then it is imperative to know what the old is, to study the contents of pupils' minds on entering a secondary school, as well as on entering a primary school. And not to study simply the what, but to study the relations, the organic potentiality of what the pupil already possesses, or already is. This is specially true of the beginning of the secondary school, where, unless the teacher is wise, there is like to come a break, which shall destroy the continuity so essential to the highest education.

Thus, upon at least three counts, the training of secondary school teachers is fully as imperative as the training of teachers for the lower schools. The peculiar and important character of the changes which at that time of life develop in the pupil ; the necessity of greater specialization in work, which demands that the specialist shall see his own work in its proper relation ;

and third, the field of earlier education with which the teacher in the secondary school should be familiar.

If we grant, then, the necessity for training teachers in the secondary schools, we must consider the practical question: In what does the training proper for a secondary school teacher consist? Few of us would feel competent to answer this question. Only the school committee man fresh from politics would be willing to answer it off-hand. To us as teachers who have gained the art by laborious practice, united with what often seems inspiration, the question is one of doubt and perplexity. We feel ourselves inclined to say with Topsy that we have just growed. The *how* is so dominated by the element of time, that it seems impossible to eliminate it and shorten those years into months, and yet that is what training should do. It should point out the diagonal where we have laboriously toiled around the sides. It should condense experience without diminishing its strength or sweetness. Trial alone can fully solve the problem. We may however be able to set forth a few general principles which shall meet with the approval of all, and serve as points of starting for a concrete realization of our hopes.

The story is that Socrates first met Xenophon in a narrow lane, and putting forth his staff stopped him. "Tell me," began Socrates, "Where does a man buy meal?" "In the market place," was the answer. "And oil?" "In the same place." "But where does one go to become wise?" The youth was silent. "Follow me," said the sage, "and I will tell you." The greatest educative force is individuality. No influence can equal that which comes from master upon disciple, and, as it

is the true man alone who can be the true teacher, so the first requisite in the teacher is himself to be a man, and the first principle which should dominate all training of teachers is to cultivate freedom in the individuality. This has been the weak point of the normal training of the past; method, method, but no man behind the method. Machine methods of teaching can only make machine scholars. They sap the vitality of teachers and scholars alike. And yet method is indispensable to all success, but only living method, and in the hands of the man who has assimilated it, made it his own, put his own life into it.

"The meaning of life here on earth" says Carlyle, "might be defined as consisting in this: To unfold *yourself* to work what thing you have the faculty for. It is a necessity for the human being, the first law of our existence." A slave can only do a slave's work, and there are no chains so debasing as spiritual chains. This freedom, however, does not mean license, but only this, that the mind of the teacher shall always be kept upon the end and not be spell-bound in contemplating the means. The best way to hit a mark is to fix the eye upon that and not upon the muscles which move the arm. This principle of individuality is the lens through which we should look at all other devices. It is the die which alone should stamp the pure gold of genuine teaching.

The first principle, then, for the guidance in training is the sacredness of individuality. The second is the broad *point of view*—to open to the teacher the problem of education, both in its wide sense of the end, and its narrow sense of method in separate studies. He must

learn the problem of education, first spelling out the words, tracing the line with slow moving finger, then stating it in algebraic terms. The solution no man knows. It is far more important that the young teacher should have a clear view of what the problem is than that he should reverence any man's solution. This familiarity can be acquired only by a study of the history of education. He must think the thoughts of the great thinkers of education, the thoughts of Plato, of Aristotle, of Rousseau, of Pestalozzi, of Herbart, of Mann ; think them and make them his own ; striving to rise upon them as stepping stones to a truer solution of the problem than they have reached. He must clash with them, contend with them, wrestle with them, until they are his. It is a lamentable fact that in our varied discussions of educational questions so little is to be heard of reference to the history of education ; what men have already done ; where succeeded, where failed. No wonder that the same mistakes are repeated by generation after generation of thinkers. When the torch of history sheds no light upon the present there can be little progress.

This broad point of view must be aimed at, not only in the comprehensive questions of education, but also in the narrower questions of method. Here there must be a knowledge of the problem in all the fundamental studies of the secondary school. It is not enough that he be grounded in one or two merely. He cannot know one properly without knowing the principles of all, though his work must be intensive in a narrower field. The long discussion of the question of English has made plain what in a larger or smaller sense is true of every

study, that it is indissolubly linked with every other study, and that, storm against concentration in the Herbartian sense as we will, concentration is upon us ; not an exotic transplanted from the jungle growth of German philosophy, but a concentration of indigenous growth, native to hard-headed practical New England.

The third principle is the principle of *continuity*. The young teacher must learn that the work of education is a continuous one ; that it begins with the cradle ; and above all, that, in the early years of the child, the problem is presented in a form best for the learning and observation of the future teacher. Thanks to the labors of the pioneer reformers, to the martyrs for popular education, the work of the primary schools has been put in a position where it may serve as a model for teachers of all grades. These men were saturated with the true love of humanity. When it is the prayer of every teacher that the mantle of these Elijahs shall fall upon him, when every teacher shall bow in reverence and love before the little child set in their midst, then will come a millennium whose rosy-fingered dawn has already begun to break, the herald of brighter day. And so I would say, send your teachers for the secondary schools to the Kindergarten ; let them give close attention to the early work in the primary schools. There they may see teaching free from all temptation to pedantry, without the possibility of rivalry between teacher and taught, teaching in which the knowledge of the teacher so far passes the knowledge of the pupil that the *how* of method may reign supreme.

The fourth principle may be called the *psychological principle*. By this reference is not made to the psychol-

ogy of formal treatment. Careful work in this field should precede the special training, but to that practical psychology which is the outcome of child study, meagre in its results, scientifically perhaps, but rich in its practical wisdom. Psychology unaided has not been able to furnish a footing for the building of a theory of pedagogy; but with the aid of child study we may sometime hope for a firm foundation. All honor to the sage of Worcester who is the inspiring leader in this movement. Scientifically we need a most careful study of the period of adolescence. Perhaps our young teacher may add little to the knowledge of the world in this intricate subject; but he may add immeasurably to his practical wisdom, and gain a sympathy for his pupils which shall be an invaluable possession to teacher and pupil alike.

But whatever the training upon the side of knowing, there must be the richest of training on the side of doing. This training must not consist of a lesson here and there, but there must be continuous work with classes covering long intervals of time, that the teacher may learn to have that grip upon subject and class which is the mark of the successful teacher. The student-teacher must go into his class room alone with his class and shut the door. Such an experiment in training teachers by practice has been tried during the past year in the Providence High School, and has met with success as far as can be judged in so short a time. Eight student teachers have been appointed for the coming year. Six of these student teachers are graduates of Brown University, and seven of them during the past year have taken the course in pedagogy at Brown, a course of three hours a week, covering a study of the

history, theory and practice of education on the lines set forth in the previous part of this paper. The amount of knowledge has not been the aim so much as the cultivation of the right attitude toward the work. Next year these student-teachers will be assigned to half-time work in the high school; each is assigned full control of classes in at least two branches of study. To the scholar they stand in exactly the same relation as fully qualified teachers, but behind the scenes they are assigned to the special supervision and guidance of supervising teachers, who, in general, are the heads of departments. They are assigned classes which are doing work parallel to that of some experienced teacher who sets the pace for their movements and serves as a guiding example. Each supervising teacher will meet in conference once a week the student-teachers in his department, and as each student-teacher is assigned to at least two departments, he will have two conferences each week; these are informal meetings, and are the summing up of the experiences and observations of the week. Besides this there will be a meeting once a week, when the threads of the work are gathered together by the director of the training department, who is also professor of pedagogy of Brown University. Once a week there will be a seminary in methods, led by the supervising teachers of the different departments, at which all the student-teachers are present, and as preparation for which a large amount of reading and observation will be assigned. A student-teacher thus is not confined to a knowledge of method in the department in which he is doing intensive work, but studies also the problem in all the leading branches of secondary school work—Latin, Greek,

French, English, history, mathematics, physics, chemistry. Thus a broad foundation is laid for the intensive work.

Once a week also a seminary is conducted by the Professor of Pedagogy of Brown for the thorough study of particular subjects, chosen one for each quarter, thus: —Herbartian Pedagogy, Child Study, including the period of adolescence, School Hygiene, Educational Values, etc. At the same time each student-teacher is assigned a theme for a thesis to represent careful mastery of that subject through reading, experiment and observation. The student-teacher is expected at this point to reach the frontier of thought, and penetrate a little way, however small, into the regions of hitherto unknown truth.

The prime purpose of the high school in undertaking this work is to secure trained teachers, and raise the professional spirit of its teaching corps. The student teachers undertake the work with the hope of securing good preparation as teachers, and good places as a result. It is gratifying to say that the plan has attracted the very best men. Of those who complete the course this year, the high school has taken one-half. The other half have secured good places elsewhere, receiving, I may say in parenthesis, two or three hundred dollars more than the high school could offer. When these are needed by the school after their experience in other places, the high school hopes to be able to call them back.

In presenting this paper the idea is not to advocate this particular plan but to make an earnest plea for the professional training of teachers for secondary schools.

Into these schools come those who are to be the leaders in thought and action in our land, and together with them the sons of the great middle class of citizens. The work is not to be done upon base metal, but upon the finest metal the minds of our country can produce. It is foolish to trust this work to the hands of unskilled workmen, to the Chinese labor of imitation. Our young high school teachers, untrained, enter upon their work with enthusiasm; they are men of scholarship and character, but in most every instance their methods are determined by the methods of that teacher who in preparing them for college impressed them most; they are about eight years behind the times. Their memory of methods into the rationale of which they were never inducted is dim and superficial. With their bright hopes and aspirations unguided they soon, in too many cases, suffer arrested growth, and fall into the hum drum of mechanical teaching. The four walls of the schoolroom are as opaque to their spiritual as to their physical vision. Teaching becomes distasteful to them; a mere form of money getting; they become mental dyspeptics, and if physical dyspepsia is not contagious, spiritual is certainly most virulently so. God pity the scholars. What we need in our high schools is men makers; teachers with the highest conception of their calling; men who will look upon it as a life work because of the great amount of good in the world they can accomplish. Does it demand sacrifice? The noblest will sacrifice the best for a noble work. Does society look with distrust upon the practical wisdom of the teacher? Let the teacher be worthy of trust and it will be granted him. Is teaching not numbered fit to be named with the honored trinity

of professions? It has been the teacher's fault. They have out-stripped him in the race. Let the license to teach, as it was the first degree to be conferred by a university, be the most honored. My friends, the field is ripe for reaping. It is the consensus of opinion that teaching ought to be a profession; that its work in importance is second to none; that while the other professions restore,—medicine to health, law to justice, theology to righteousness,—teaching is the science by which evil is anticipated by prevention; by which the bad never exists, because of the development of the good. Of all the imperative needs of education to-day, the need of leaders is the greatest. If we cannot be leaders ourselves let us train those who shall be leaders, that by the strength of our purposes and through our labors and toils, education may be exalted upon that throne of honor to which all with spontaneous edict declare her entitled.

## DISCUSSION.

Remarks by Samuel T. Dutton, Superintendent of Schools, Brookline, Mass.

After three able papers on the subject of training, it will be unnecessary for me to make extended remarks. I have shared the pleasure you have all felt in listening to the address by Prof. Jacobs. It is so broad in its scope, so catholic in tone and so progressive in its spirit as to make it a distinct contribution to the literature of this subject. He has brought forward no set of recipes or bill of particulars, he has not gone deeply into the details of method, but he has given us a definition of

education that is as lofty in its conception as it is true and reasonable in its essence. Such a definition not only establishes sound reasons for the training of teachers, but it suggests what the nature of that training shall be. In the working out of all educational processes our labor becomes easy when we hold to the central thought that education is life and that we are aiming chiefly to nourish, to quicken, and to inspire that life in every possible way. At the meeting of the National Association in Buffalo, on Friday evening last, Gen. Stewart L. Woodford, who is more of a politician than a teacher, and more of an orator than an educator, endeavored to reach a climax in his address by first criticising the public schools for their lack of thoroughness and then declaring that he had examined a boy of fourteen, a graduate of a grammar school, who could not give the name of the capital of Nebraska or tell who was the second president of the United States. The applause upon this outburst of eloquence was but feeble. The next speaker was Bishop Spalding, of Peoria, a man of spiritual insight and of humanitarian sympathy. He drew a beautiful picture of the progress of humanity, upward step by step, and showed that education in its highest sense is ministering to the life and growth of the human soul. At length he said, "if a boy is full of healthful life, moral, physical and intellectual, and is fully conscious of his God-given powers, I care not whether he can name the capital of Nebraska." The enthusiasm elicited by this sentence showed the temper of the audience.

I will not take the time to speak of the three important reasons, given by Prof. Jacobs, for the training of

teachers in secondary schools ; neither is it necessary to review the elements which ought to enter into such training,—they were clearly defined and their importance cannot be questioned. Were there time I should be glad to emphasize the importance of experience and practice, as distinguished from theoretical instruction. I am led to believe that persons of liberal culture gain the needed self-control and confidence, as well as a good degree of skill, by being permitted to work themselves free with a minimum of supervision.

I will however call attention to one or two things that were either only implied, or lightly touched by the previous speaker.

In the first place every educated person who is to become a teacher should be required to faithfully interpret his own educational experience. The prepossessions of the pupil teacher are apt to be very strong. However soundly he may be grounded in theory, when he comes to actual teaching he is apt to sink back to the level of those methods under which he himself was taught. The rigorous and long continued process of his own education has impressed him deeply and given him a certain bias from which he is not easily set free. Therefore, I say, it is necessary for the young teacher to go back and review the steps of his own pupilage, to consider who of his teachers aroused and inspired him to his best efforts, and who simply held him to a mechanical routine giving no zest and enthusiasm. He should inquire what means and methods were direct, positive and inspiriting—in short by looking thoughtfully over his own school life he should be able to separate the wheat from the chaff and resolve in his own work to take the former as his model while discarding the latter.

A second consideration which cannot justly be overlooked in the training of teachers for higher work is the fact that education is one of many social forces that are operating together to elevate human society, and that it is the most central, comprehensive and inclusive force of all. The church, the home, the school, the library, the newspaper, society, and the state, all make their contribution to the education of the individual man. The fact that they are all working together to one common end is often overlooked. Even the church forgets that the founder of our civilization was himself a teacher rather than a preacher and that he employed what are now known as educational methods in his teaching, methods which the modern church is gradually adopting and is likely to use still more in future. Not only in the elevation of the ignorant, but in the reformation of the criminal, the upbuilding of the weak and defective and the christianizing of the uncivilized, the same principles of action are fundamental. The time has come when there should be a correlation of those forces that make for a broader, purer and more beautiful public life.

Every student of education as a science should see the dawn of the new era when teaching is to be the greatest of all professions, inasmuch as it focuses in itself all those means and processes which are available for the enlightenment and cultivation of mankind.

In the further discussion of this subject, two self-evident truths may as well be recognized:—

1. That teachers of secondary schools should have a college training or its equivalent.
2. That college graduates make better teachers when they have had some professional training.

Accepting these two fundamental points, I propose to remark briefly on two other propositions that may not be so readily approved. These are: (1.) That the college graduate needs some experience in lower schools as a part of his training for work in the secondary school. (2.) The primary and grammar schools to-day need the studious attention of liberally educated teachers and offer attractive opportunities both in the nature of the problems involved as well as in respect to pecuniary inducements.

During the past year a class of college graduates have received training in connection with the Brookline schools. They have had ample opportunity to observe in all grades from the kindergarten up, have taught for several weeks in succession one or more subjects, with advice and suggestion from competent teachers, have received instruction upon the history of education and the principles of teaching, and have written theses upon important educational themes. With one exception all have had their practice in grammar grades. They readily adapted themselves to varying conditions, were uniformly happy in their work. While the regular teachers were at first reluctant to have them in their rooms, they came at length to enjoy their presence and value their assistance. With the experience of the past year in mind, I am prompted to ask: Why does the young woman who holds a college diploma look with such aversion upon the thought of teaching in primary or grammar schools? It is probably due to several causes.

(1.) The student life in its later years had ministered chiefly to a love of the subjects pursued. A conceit of knowledge and a desire to continue in the atmosphere of advanced study is the result.

(2.) The impressions retained of primary and grammar school training, received ten or fifteen years ago, with its narrow and uninteresting curriculum and mechanical methods, are suited to repel, rather than attract young minds that have tasted the sweets of scholarly culture.

(3.) The salaries paid for service in high schools are somewhat larger than those in the lower schools. Few college women have insight sufficient to understand the relative greatness and interest of the problems to be solved in the lower schools; neither have they courage and faith enough to labor and wait for the pecuniary prizes that are in store for those who are able to direct and supervise the training of children in common schools.

Of nearly a hundred women, graduates of colleges, whom I have known during the past two or three years as seeking positions as teachers, scarcely one desired to work below the high school. In only one or two instances have I been able to convince them that experience in a grammar school, under the right conditions, would be valuable, and would probably lead to a position of much responsibility as principal or supervisor.

In a solitary instance, about four years ago, a young lady, yielding to urgent advice, accepted a position as assistant to the principal in as pleasant a grammar school as exists, where all the instruction is of a grade usually given in high schools. But the arrangement was not a success. The incumbent actually pined and grew thin under the feeling that she was working below the level of her ability and accomplishments. She retired at the

end of the year ; but her eyes have undoubtedly been opened, for not long since she wrote expressing a desire to have a similar opportunity again.

In my first conference last autumn with the training class, to which allusion has been made, it was apparent that not one of them had thought of anything lower than high school work. I succeeded in convincing them of the necessity of observing and practising in the lower grades, and with one exception, all have had their training there. Several are employed to work in grammar grades next year, and I am expecting great things of them.

The facts just stated suggest to my mind one of the most difficult phases of this whole question. There is not demand enough in secondary schools for all college graduates who desire to teach, and, as yet, very few are ready to attack the problems connected with the education of the 95 per cent. of the children who never enter the high school. But the college graduate needs experience with young children. He needs to comprehend the newer discoveries that have been made respecting their wonderful capacity to receive and assimilate knowledge when properly presented. He needs to understand that nutrition is a greater factor in infant education than drill ; that while the one strengthens and enriches the life, the other often narrows and cripples it. He must know that observation and experience are the only means of real education and that teaching is only supplementary to these means.

College graduates who come from an atmosphere where books are of much account, have to learn, that in the early stages of an education, books are to be used

but sparingly. They need to study the elementary curriculum in its many sidedness, and see its adaptation to the development of young lives. Any person, college graduate or otherwise, is better prepared to teach in a high school when he has sat as a learner in a kindergarten and has grasped its unity of plan, its spirit, its humane and sympathetic gentleness and courtesy, and grasped it so thoroughly that even though he becomes the teacher of a special subject, as many high school teachers do, he will think more of the pupil than of the subject, and so conserve that unity and proportion that are the end of all true education.

Nature study, drawing, music, the manual and domestic arts, physical culture, history and literature, have all been brought into the primary school within a few years, and have so changed it that the college graduate will feel as strange there as he would upon entering the Gardens of Paradise. Since *he* conned the primer and scratched letters and figures upon his slate, a new life has entered the schools. Activity has taken the place of silence ; naturalness that of artificiality ; interest and pleasure that of dullness and apathy.

To be brought into the atmosphere of a thoroughly modern, enthusiastic elementary school, to study its phenomena, become a part of it, enter into its work, and become inspired with its motives and purposes, is an excellent tonic for college graduates, many of whom, in spite of all their learning, without such experience as this, are quite helpless and ill at ease in the school room.

Cultured persons who enter into child study, learn to enjoy companionship with children, and by actual experience in teaching them gain alertness of manner, skill

in presentation and questioning, and steadiness of control, are well prepared to teach in any grade for which their scholarship has fitted them.

While it is not pertinent in this discussion, I want to say in closing that, while college graduates need experience in lower grades of school, conversely the lower grades need the college graduates, and I must say that I dissent entirely from the inference often made that college graduates are needed chiefly in secondary schools.

The broader view and the higher culture possessed by the Bachelor of Arts will find ample scope in the working out of plans for the more hygienic and humane treatment of young children. Ability here will be promptly recognized. The law of selection will operate in favor of those who can grasp the problems and achieve the victories.

There is little in the work of organizing a school or of directing a system of schools that an educated woman cannot do as well as a man, and if, as is sometimes the case, the choice lies between a first-class woman and a second-class man, the woman is almost sure to be preferred. Good women are less likely to be drawn into the meshes of politics; they are often more enterprising and courageous. In this age of woman's advancement I see no open door of usefulness that may be entered so easily as that of leadership in the affairs of elementary education.

Hence, any theme of advanced training in pedagogy should include the study of the school system as a whole, with its history and its laws, and the principles and practices of school supervision, for it may be assumed that

college men and college women who turn their attention to the common schools will be called to perform executive duties. It should include a study of the community and of all those forces that work together for the enlightenment and elevation of society. Above all things, it should seek to awaken that deeper interest, that consecrated spirit, and that larger life that are the end of all education.

## VII.

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### THE AESTHETIC ELEMENT IN EDUCATION.

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It needs no expert to note how easy it is in education for the ways and means of doing things to become divorced, as it were, from the great things that ought to be done. The philosopher analyzes the things that children should know, finds the elements that are common to them, and puts them in order in some scheme of study. The teacher presents these elements, the pupil studies them. The attention that is focused upon them magnifies them unduly. Almost before we know it, they usurp the supremacy that belongs of right to those things only from which they have been detached and to which they are clearly subordinate. And a dreary supremacy it is, —this exaltation of the real or supposed means of expression above the things to be expressed, the school life expended on the former and the latter left to the hap-hazard of contingencies.

In drawing, for instance, are not children sometimes kept pencilling away at lines and angles and such juiceless things as if these things were not the paltry means of expression but great themes in themselves? In manual training, are they not sometimes kept at work with sur-

faces and joints, without a hint of the larger language whose alphabet they are learning?

Our philosophy, indeed, is all right. It holds before us ideals of direct work in stimulating thought and feeling in the child and securing their immediate expression; it admits that to do this main work, the child must be drilled in the means of expression, which drill must be kept subordinate; it claims that there is a possible happy union of the main work with the subordinate so that they may both advance in mutual sympathy, with equal step and effectiveness.

But when it comes to our poor practice, unsupported, as it often is, by personal attainment—hampered, as it always is, by untoward conditions,—inclining, as all else inclines, to the lines of least resistance, we have to admit its downward trench. Our beautiful philosophy survives in these Bethlehem meetings, but our rebellious practice keeps on in school.

And so it comes about in education as in religion that we need frequently to reason with ourselves, and have others reason with us, if we would not lose sight of our ideals.

We are told on eminent authority that art is “the solidiest and sincerest expression of human thought and feeling,” and that, if we seek for its grandest law, we shall find it to be this: “To be much within and little without, to do all for truth and nothing for show, and to express the largest possible meaning with the least possible stress of expression.” But the thoughts and feelings of human beings cover innumerable themes in the world of God and the world of man. They find expression in all forms of human activity,—in gesture, in conversation,

in literature, in every art of production and in every art of design. The higher expressions of thought and feeling, whatever their medium, form or robe,—expressions that are eminent for their truth, their strength, their fitness, or their beauty, that never cease to tell their impressive story and are always suggestive of more to tell, these belong to the domain of art. The great doer, whatever he does, is, in some sense, an artist; and those that feel the thrill of his workmanship possess in varying measure the artistic feeling.

Art, you see, has, as it were, two sides. If it is in the expression, it is in that which prompts the expression as well. If it is in the product, it is also in the mind that inspires the product. The mind may take in and enjoy what is artistic; it may give out and do what is artistic. There is the passive, interior, receptive aspect of art; there is its active, exterior, creative aspect. There is art *in posse*, as the lawyers say, and art *in esse*,—art in idea and art in execution, art potential and art kinetic. One may be an artist in thought and feeling only; one may also be an artist in doing. The feeling for art enlarges the field of human interest and happiness; it is a prerequisite to creative art; it is ample in itself to justify any education that fosters it. If such feeling blossoms forth into high doing, as sometimes it will, it is an additional argument in favor of the training that nourishes it.

No large view of art is possible that does not ally it with that which makes for righteousness. Both send their roots down into the same soil of truth, fitness, sacrifice, power, beauty; and if either is at all estranged from the other, it loses something of value and bloom.

We feel that something is missing both in the art of a

Byron and in the righteousness of the Puritan. We want the soundness of art as well as its beauty in the one ; we want the beauty of holiness as well as its soundness in the other.

If art is taken in this large sense, it cannot properly be ignored in any system of education that is worthy of the name. This is another way of saying that the aesthetic element is an essential element in education. Whatever the form in which the expression of thought and feeling exhibits itself, there are always the *elements* of such expression for the pupil to learn ; there is always its *common, everyday speech or language* in which he should become proficient ; and there are its *master-pieces* for him to study, to enjoy, to aspire to, and possibly in time to equal. This means, of course, three corresponding levels of attainment,—the first, of disconnected elements separately learned ; the second, of these elements united in the ordinary language of the expression ; the third, of the language put to its noblest and most finished use. He is an unpromising pupil who cannot readily occupy the first level while in school and, during the same period, make a beginning, at least, of standing upon the second. As to the third, the pupil's soul can be touched there long before he can hope to accomplish much there. We may think of the student as trying to rise to these levels through successive years of schooling ; we may think of him with equal propriety as trying to occupy them all during each and every year of his schooling. The elements, the language, the master-pieces of expression, have their places in the *rank* as well as in the *file* of educational means, in the *woof* as well as in the *warp* of the educational fabric. This conception of growth, affecting,

as it does, the scheme of instruction, has already yielded us good modern ideals for the study of English. There are its elements for beginners in reading and writing, there is its language for ordinary daily use, and there are its artistic expressions known as its literature,—the primer at one end and Shakespeare at the other, with long years between mastery of the former and high appreciation of the latter ; and yet each advancing year the child is exercised in them all,—the elements, the language, and such literature as is suited to his years.

The logic that frames such an ideal for instruction in English would frame a similar one for every great means of expression, for whatever the means, there is the same long and varied range from low to high as in English. Every means of expression has its exalted *something* that corresponds to the literature of English. The gamut of drawing is from the child's rude scrawls to Michael Angelo ; of color, from daubs of barbaric red to the splendors of Rubens ; of the moulding of form, from spheres of mud to the Venus of Milo ; of the art of building, from the child's crude playhouse to St. Peter's at Rome. It is so not only with all the arts of design but with all the arts of production,—always crude, coarse, ugly at one end, always refined, admirably adapted, elegant at the other. Nay, the arts of design and the arts of production are really one. The former have their historic development from the latter. Art is the handmaid of the artisan ; it is the beauty of his soul issuing from his finger tips. What is made for common use serves a higher, and the triumph of the art is striking when the lower use seems a profanation of the higher, and the work, rescued from its inferior service, finds a place of honor, in some noble art collection.

Fancy for a moment an ancient Etruscan risen from his sleep of two or three millenniums and roaming through a modern art museum,—the surprise, merriment and gratification of the man at seeing, patched, pieced and restored—their homely uses forgotten—the familiar vessels of his kitchen and scullery !

You see the drift of my thought, of course. Drawing, painting, designing, modelling, music, the arts of construction—all these are so many forms of expression, so many kinds of language.

The schools are giving increasing attention to their elements ; more attention should also be paid to their master-pieces. Whatever the beginner does in any of these branches, both his feeling and his doing are crude and barbaric ; they need strengthening and refining. Now the feeling can be developed somewhat without the doing, but the doing cannot be developed far without the feeling. In improving one's own handiwork and in studying the best handiwork of others, there are high possibilities for culture, just as there are in improving one's own English and in studying the best English of others. The aesthetic element needs to be cultivated as much in handiwork as in English. It needs to be cultivated in the doer as well as in the thing done.

Let us pass at once to some principles of vast consequence that teachers and students of the arts of design, of representation, and of construction cannot afford to lose sight of.

And one of them is the transcendent importance, nay, the necessity, of the child's framing and developing in his own mind the ideas, the concepts, the standards, by which he should be guided. It is a truism, I know. But

there is the significance of it,—the deep, inner stubborn meaning of it that I would press home. It is, of course, a fundamental principle in all teaching,—this lodging and fixing of ideas in the child's mind for him to work from. If child study has any value, it is in finding out precisely what ideas or concepts are present in child experience for teaching to connect with and build upon. Any teaching that ignores actual child concepts and actual child ways of enlarging such concepts, but relies on concepts or standards in the teacher's mind or in books or in other places than the child's mind, is to that extent unsound.

Indeed, the essence of education lies precisely here, says Professor James. It consists in taking natural reactions, the things a child does on impulse and spontaneously, and knitting them to new consequences. Thus the child is furnished with new ideas. Once he responded to a stimulus ; now he responds to what has been associated with that stimulus.

The domination of the senses has given away to that of ideas. The child ceases to be a waif of impulse ; he has become a creature of deliberation ; that is, he has been educated. And the length and width and height and depth of his education—it all turns upon the length and width and height and depth of the ideas that have been welded to his primary impulses.

A child draws a house. It matters not what pretty houses may have been pictured on the retina of his eye. He draws only what is in his mind, what he sees with his mental eye, the two or three things he has crudely made his own. And so if he makes his door two stories high, if he draws a man taller than the door, if he lets his flag float one way and his smoke another, it is because he does

not see to the contrary. When he sees for himself that the door should admit to the first floor only, that the man should be able to get in at the door, that the wind cannot blow opposite ways at once, he will straighten these things out and not before. Nay, if he is drawing from the object he cannot do much better, because although the eye pictures much, the mind pictures but little, and it is the mind, not the eye, that guides his pencil. Even the observant Agassiz, if asked to look at something through a microscope, was wont to insist on knowing before looking what he was expected to see, so afraid was he of missing it.

There is only one way: and that is to train the child to draw what he *sees*, not what *is*, for what *is*, is forever beyond him; to draw what *he* sees, not what *you* see, for what *you* see is outside of *his* mind and cannot shape its action; to draw what his *mind* sees, not what his *eye* takes in, for the eye takes in ten thousand things that never reach the mind. The standards for the child to go by must be the incomplete and crude ones of his own mind; they cannot by any possibility be other than these.

The concept-forming power of the mind, however, is something marvellous. Take the extreme case of a person congenitally deaf. Why is he dumb? His vocal organs are perfect; give them the right stimulus from the brain, and they will act. In other words, the mind can direct these organs just as soon as it has concepts or standards of the sounds to be aimed for.

But the sad fact is that no sound has ever entered the deaf person's mind; his mind has no conception, therefore, of what sound is; it does not realize its own silence even. *Vocal organs*—the idea of *vocal* is forever beyond

its grasp. There they are, those wonderful organs, all ready for their appointed work and the mind doomed never to know what that work is. The deaf are deaf through physical powerlessness, but they are dumb through mental powerlessness, dumb simply and solely because the mind has no standards of sound to go by.

And yet the deaf can be taught to speak after all. Standards of muscular positions and efforts are attainable by them, if standards of sound are not,—standards attainable through the eye if not through the ear; and by these the organs of speech are unlocked. Now there is an adaptability of mind in all this that is astonishing, and the climax of astonishment is reached when we hear those speak who have been not only deaf from infancy but also blind; for now we are in the presence of concepts into whose fabric neither sound nor vision can enter,—concepts that are built up by touch under guidance, that exist in the mind as terms of muscular sense, that the tissue of the brain has literally grown to, and that find expression in what to the speaker is only a silent posing of organs, a silent using of muscles, but to the listener intelligible speech.

I had the pleasure last June of making the acquaintance of Helen Keller. This young girl has been deaf and blind from infancy and for many years she was also dumb. She is to prepare for college in Cambridge and to enter Radcliffe. With neither sight nor hearing, she promises to surpass in scholarly attainments many possessors of both. I recently addressed the school where Helen is to study and whose closing exercises she attended. Imagine my astonishment when Helen's teacher, Miss Sullivan, said to me that she had reported to Helen every word of my

address as rapidly as it was given. She did it by making signs into the palm of Helen's hand. I know not which was the more surprising, Miss Sullivan's success in reporting the speaker with her swift and wonderful signs or Helen's success in interpreting those signs in her swift and wonderful way.

Had Miss Sullivan reported me orally, Helen could also have followed me by placing her hands upon her teacher's mouth.

To this power of interpreting both signs and spoken words, Helen adds the power of intelligible and expressive speech. Indeed, she recently addressed a large audience in Washington. What a marvellous revelation it all is of the concept-forming power of the human mind !

These two points come out, then, with distinctness,—the impossibility of the mind's working apart from its own standards, the marvellous adaptability of the mind in acquiring standards. Now what are the teacher's relations to these standards? Right teaching of the child leads him to enlarge and improve these humble standards ; it seems to find out what they are ; it makes much of the child's interest in them ; it respects the child's fidelity to them, it trusts the same laws of growth for them that it trusts for the child's learning to walk ; the artless activity of the child in making and doing, the very thing he used to get his knuckles rapped for, it welcomes as a sign of promise.

The teacher, you see, works at the beginning and the end of hidden pathways. He can control in part what enters there. He can see in part what issues thence. But the pathways are nature's own, and midway, out of sight, are the all-important standards. Here, apart from the

teacher, the real educational process goes on. It is a record in cell and tissue, a record built up through the slow processes of waste and growth. By no possibility can the mind be pushed ahead of this physical record of its activity. Certain outward conditions the teacher controls; the process itself,—that is too intricate, too delicate, too vital for him to manage, and so nature handles it herself.

The thought that begins to stand out in all these words is this: That imitation is our great reliance in aesthetic training. I do not mean imitation in the sense of blindly or mechanically copying, but in the higher sense of acquiring standards in nature's unconscious way and of conforming the practice to them. The child is always in the realm of imitation. He always likes to do things, to do them as he sees others do them, to do them as well as others do them or better, and to possess things, especially if it costs him something to get them. The child's interest centers in and blossoms out of these four primary instincts. There is a chance for him to go astray in each of them. Bad construction,—that is botchery or mischief; bad imitation,—that is yielding to poor or evil example; bad emulation,—that is full of envy and vindictiveness; bad ownership,—that is unearned or dishonest possession. But there is the golden opportunity as well of his rising through judicious use of these tendencies to noble youth and manhood. All this is simply another way of saying that the child's environment may do him good or harm, that the examples set the child may be for his weal or his woe. In short, the right use of these instincts practically resolves itself into the various ways of seeing things as they ought to be seen and

doing them as they ought to be done, that is, of seeing and doing them in conformity to good standards. Thus the philosophy of imitation and that of learning by doing run into each other and become essentially one.

Ruskin tells us that in *manufacture* we use the hand only ; in *art*, the hand and the mind ; and in the *fine arts*, the hand, the mind and the heart. All this is sufficiently true for Ruskin's purpose. The fact is, however, that any use of the hand that is not automatic involves with it a play of both thought and feeling. In pure manufacture, there is little thought and less feeling ; in art of an ordinary sort, more thought with an increase of feeling ; in the fine arts, the blended play of thought and feeling at their best ; but always the mind, in whatever it does, is moving as a unit. Psychology may separate mental functions one from another to give an isolated view of each, but there is no such separation in mental action. Better guidance of the hand, truer thought, finer feeling, —any one of these things granted, the whole mental action is lifted.

The important point is to keep the child's mind steadily active in these three classes of functions and on ascending lines. It will never do for the teacher to cut adrift from the child's humble concepts or his artless interest in them.

Thus we see why, in drawing, for instance, crudest expressions of thought need to be respected, why the germ of fondness for it needs to be nourished, why the drawing habits should be early established, why we ought to be hopeful if new thoughts keep coming out in the rude work of novices. We see also why there should be abundant practice,—plenty of paper, plenty of objects, a

little judicious questioning now and then and but scant indulgence at first in telling. We do not tell a child how to learn to walk ; we cannot do it, we simply encourage him to walk. Then comes a time for shaping the child's work, directing his observation, leading him to see the sphere in the orange, the cylinder in the tree-trunk, and all that. From the beginning it is the free expression of thought, not the painful drawing of pictures ; the mind kept on the thing to be expressed, not on the language that expresses it ; the child thinking with his pencil,—at first as his own fancy prompts him and then as the teacher begins to lead him. And the various expedients adopted in the teaching of drawing have one element of promise in them if pupils, because of them, work voluntarily beyond the specific exercises assigned them.

Indeed, why should they stop with an assigned lesson,—especially with one that insults their capacity? Why should the teacher discourage, or, at least, fail to encourage the doing of work he cannot examine and correct? The principle is wholly bad that no work should be done by pupils beyond the teacher's power to criticize it completely. It means for the conscientious teacher no escape from the bondage of those headache stacks of papers, stacks that, heaped however high, mean practice for the pupils that is shamefully scant. When shall we learn that corrections imposed upon pupils from without are infinitely inferior to corrections that come from standards growing within them? Making blue pencil marks into the midnight,—such work by the teacher is not getting at the heart of things. The learner must wield his own blue pencil. Let the school ideal be, rather, plenty of work by the pupils,—uncorrected work, blundering work,

if you please,—more work in the aggregate than the teacher can possibly handle by blue pencil methods. I do not mean work that the teacher may ignore ; on the contrary, he cannot get such work unless he has a glowing interest in it. I do not mean that he shall not care to have it corrected ; on the contrary, he shall bring his profoundest skill to bear on those standards within from which only amendment can come. I have seen great quantities of work done by pupils,—in algebra, in geometry, in chemistry,—without thought of detailed criticism by the teacher, work of steadily improving character, the only incentives thereto being the interest of the pupils in their own work and in the work of one another, the gentle pressure of the teacher's interest as shown in hints about subjects and the handling of them, the influence of exhibited specimens, and so on.

Drawing as a simple language needs this extended practice ; its culture value is not easily reached without it ; its art value is impossible without it. Of course, no school sets itself the impossible task of training any one to be an artist. If it sends an artist forth, call him the gift of God, not the product of the school. It is a great thing, however, if the conditions of school work have been congenial soil for the artist to grow in. Practice in drawing that means abundant seeing and thinking is certainly such soil, for the more of such seeing and thinking the more likely the soul is to be moved ; only the seeing and the thinking, if culture purposes are to be served, must be supplemented in various ways.

In the first place, the pupil must be led to refer the endless phenomena of appearances and constructions to a few elementary principles. It is in drawing and

construction as in science,—if one grasps a principle, he grasps a thousand facts; and when he grasps a deeper principle he grasps a hundred principles that rest upon it. No wonder the dream comes to the artist, as to the philosopher, of some foundation principle, the deepest of all, the possession of which is the key to all there is in art.

In the next place, his attention should be called to illustrations and examples of the sort of work he is doing that are a little more elaborate, more skilful, more beautiful than any he has produced himself.

Here is where school exhibitions of the pupils' work come in,—particularly of work that surpasses the average. Such work exerts a lifting and toning influence upon the humbler workers below. Moreover, there is the encouragement of it. It is the work of learners, not of experts, and it holds out the hope to other learners that they may equal it in time.

In the third place, the master-pieces of painting, of architecture, of sculpture, of construction, should be interpreted to the pupil,—I mean only such grander features of them as can be presented in elementary ways.

All this means a certain equipment in pictures, photographs, casts and models, but it need not be an extensive equipment, if well selected. The press is flooding us nowadays with half-tone pictures—beautiful and cheap. These, too, can be so selected and classified as to illustrate and fix elementary principles. Indeed, we need some guide through this wealth of pictures to prevent a certain Sunday-newspaper effect upon us.

My thought is that we can study these things just as

we study the Merchant of Venice, or Evangeline, or the Chambered Nautilus. The objective point is to get the pupils to thinking in a larger way than it is possible for them to think unaided. Great, complete, philosophical thoughts,—those are not to be thought of, but the beginnings of great thoughts, germinal thoughts, ill-defined thoughts, that suggest other and higher thoughts beyond,—it is worth everything to start these. People may pooh-pooh at such thoughts, call them vague, ill-fitting and partial, deny them the name even of thoughts, but great thoughts in their origins have usually a chaotic aspect. The formless preceded the formed always.

A mind cannot grow very fast if fed in a scrappy way,—a bit here, an item there, a fact somewhere else. Furnishing such disconnected things is not teaching. If it were, the daily newspaper could distance the teacher, and the village gossip outstrip both. "Hitch your wagon to a star," says Emerson. That is, get the child's mind to hook on to some great principle, some comprehensive thought of God's.

Here is a tulip, for instance. How gaudy the sepals and petals! Just below, down the stem a little way, a leaf,—an unusual one, for a full half of it is colored and gay as the floral leaves above; it is almost a petal. And here is a stamen half changed to a petal, and here another, three-quarters changed, and close by a third—why, it is a full-blown petal where a stamen belongs!

Observe other flowers rightly selected for the same thought. The child begins to grasp the idea, not in its fulness, but in its germs, that the parts of a flower are transformed leaves, that a flower bud is a leaf bud changed—an idea that runs through the plant world,

illumining a million facts, and giving possession of the facts illumined. Now let the thought work. The wagon is hitched. The journey may fail even now, but the teacher has discharged his duty, for he has harnessed the team.

This should be an aim in all teaching,—connecting the child's mind with great thoughts.

Just here is the imperative reason for scholarly attainments in the teacher. If he lacks them, he sees no great thoughts in nature, only patches and shreds of thoughts. There is no star in his view to which he can hitch his own poor little cart, much less the humbler one of his pupil. So in elementary art, hitch the little mind, if you can, to a great thought.

Take this thought, for instance, how the imagination fills gaps in a drawing or a painting, how it is not necessary to put into the picture every detail of fact, how it is impossible to do so, how it would spoil the picture to attempt it, and so on. Think of the innumerable illustrations of this principle that children can take in. Perhaps it will dawn on some of their minds that the imagination of the beholder has something to do with a picture as well as the artist who makes it; that the artist must address himself to that imagination as well as to the object he is painting; that a thousand details might enter the eye and only a few of them the mind; that a few strokes are better than a hundred; that they should be strokes to reach the mind, not to stop with the eye; that it is a pretty serious matter, therefore, what strokes shall be made and what not; and so on without limit. There can scarcely be better thought-provoking themes than these at the right stage of one's schooling,—what

the painter's brush need not or cannot do, what the observer's mind can do.

Here is a man who tries for everything with his brush,—a cabbage leaf, for instance, with its bloom and its veins, dewdrops and flies on the leaf, with tiny reflections in the dewdrops and sheeny network in the wings of the flies. He gives the imagination nothing to do. And here is another who shirks every detail and tries for general impressions. Near to his canvas is blotchy with meaningless daubs; far off these daubs become foliage, fields, mountains, clouds, fine natural effects. This man gives the imagination everything to do.

Now young people can be led to take in elementary differences like these, and to think intelligently about them.

Again, how prolific in suggestions is the comparison of a word picture with a color picture? Take Shakespeare's picture of Portia "straying about by holy crosses where she kneels and prays for happy wedlock hours." Suppose a good painter should attempt the same picture. Shakespeare in his picture easily presents several crosses visited at successive times in different places; the painter in his must limit himself to a single cross visited at a particular time in one place. Size, shape, texture, color, light, shade, environment,—there is not a hint of such details in Shakespeare, but the painter must show them all. Obviously in picturing a cross the painter has the advantage. If Shakespeare had attempted as much as the painter, his picture would have read like the specifications of an architect. But the holiness of the cross—how is a painter to manage a formless, colorless, elusive thing like holiness? If he is

a genius, perhaps he can compass it. But the picture of Portia's "straying about"—that will surely baffle him, especially if he paints her in a position so inconsistent with straying about as "kneeling." And when he reaches the prayer "for happy wedlock hours," what can he possibly do with that? Something with the pose of prayer, indeed, but nothing with its sweet theme and ineffable emotions. Now the pupil that can appreciate the Merchant of Venice is ready for this sort of work. It has an opening, breezy effect on the mind.

It is capital exercise to study with pupils the possibilities of illustration in an author, to have the pupils imagine pictures of their own from the author's description, and then to show the pupils, if possible, the pictures others have worked up from the same descriptions. You may call it work in literature, you may call it work in art; it matters little by what name it goes. It is work among thoughts that concern all the great forms of expression. There is a valuable correlation about it all, and one of the issues to be expected from such work is a gain in the æsthetic sense.

Or take constructions of various kinds. Is it not quite possible in the higher grades of manual work to establish elementary conceptions of what Ruskin means by his "seven lamps of architecture?" May not pupils be led to see some of these lamps, if never so dimly burning,—the lamps of truth, of power, of beauty, of sacrifice, for instance? May they not be led to discover them in humble constructions, as well as in palaces and cathedrals!

There is really no end to the chances for stirring up thought in matters relating to the expression of things.

The other day, in company with an artist, I was looking over a beautiful Japanese picture book. I recall in one picture some sea-green mountains,—one pale unbroken wash of green from the foreground to the mountain tops miles away; also some gorgeous red flowers out of all proportion to everything else, and drawn without regard to distance. There was scarcely a trace of perspective, aerial or any other. The picture was full of untruths—nevertheless, we both liked it. The artist said it was due to certain rhythms in the grouping of the masses and in the grading of the colors. That is, the picture contained some truths that saved its art and made it reputable and enjoyable. Pertinent questions arise at once: How much of what is false in art can the truth float? What is the nature of that truth whose saving potency is so great! There is some virtue in understanding questions if they cannot be answered. Thus, in the pleasure we derive from some things that are only partly true we get an inkling of the strange, coy, elusive, but real thing that art is.

It is my fortune every Sunday to sit opposite the Horsford Memorial windows in the Shepard Church at Cambridge. There are four in all, and four spirits occupy them in the form of glorified women,—the spirits of fire, air, earth and water; and above them clouds of celestial musicians. And the longer I observe them the deeper their meaning becomes and the deeper their mystery as well. What I have sometimes minded, outside of the spell of their beauty, is a certain conflict between the ideal and the actual which each spirit of the quartette embodies. Each one of them is intensely human, except that she has great, expanded, glorious

wings. The effect is uplifting. One is ready to fly with her. But think for a moment what those beautiful wings really are. Anatomically they are an additional pair of arms. The spirit is four-armed, multi-limbed, like a Hindoo god. And when we cast about for the bony framework within the body to support such wings, for the muscles to move them, for the connecting nerves and veins and arteries, and all that, the idea grows more and more grotesque. And yet the wings delight us. There is truth about them somewhere that triumphs over the false. There are suggestions in them of upward movement, of unobstructed flight, of things not yet attained, of things celestial and eternal. Thus the spirit becomes a veritable messenger of the Lord, while a sense of shame comes over us that we ever stooped from the message to question the anatomy.

In the study of such things as these, young people can be led to see and feel that splendid supremacy of major truths over minor untruths that characterizes so much of what we see in art. Thus they may get a glimpse or two into the fascinating realm of symbolism in art. With such a glimpse, and with an inkling of Bible history, how the famous mural decorations of Sargent in the Boston Public Library would appeal to them!

I am aware that I have not pointed out wherein actual drawings or actual constructions can themselves be made more artistic. I am also aware that the teacher of English does not set himself the task of insuring the presence of aesthetic elements in the composition he requires. If, in each case, a feeling for better things is developed and a longing to attain them, that is enough, or, at least, it is all that is attainable in school. It means a growing

knowledge of better things and a promise of some movement towards them.

But enough in this vein. Let me not be misunderstood. Expression in the public schools is not likely at its best to rise above production that is commonplace. The very thing that prevents its having commercial value often gives it its educational value. That is, the educational value of doing a thing is extracted from such doing long before the thing done comes to have a commercial value. The master-pieces of material workmanship must always be as far above the handiwork of the schools as the master-pieces of literature are above the compositions of the schools. The methods of acquiring a taste for literature through reading and studying what is the best suggest corresponding methods for acquiring a taste for art. Taste in any form of expression can be developed long before artistic execution is possible. Taste comes through imitation, through absorption ; it develops in the dark as it were ; the best that the teacher can do is to give it suitable soil to grow in. Hence the necessity for abundant art material, for skilful use of it, and consequently for teachers able to use it. Indeed this paper is really a plea for the cultivation of the aesthetic sense in the teacher. If the teacher has it and the means to work with, the development of the aesthetic sense in the pupil may take its course. In all these suggestions I propose, not additions to a curriculum, but only higher aims in existing instruction.

I have not touched the value of the aesthetic element in the arts of production and design. I have been thinking rather of its value to the pupil himself. There is no sound reason why in any form of handiwork both teacher

and pupil should not rise to the appreciation of the aesthetic and spiritual aspects of themes too rashly supposed to be outside the pale of such appreciation.

Steam, electricity, and their mighty engines are by no means impossible themes for the stirring of the art sense within us.

Poets have neglected such themes, it is true. It is this neglect that provokes a stirring outburst from Rudyard Kipling : " *I'm* sick of all their quirks and turns—the loves and doves they dream ; *Lord*, send a man like *Robbie Burns* to sing the song o' Steam." For this particular song, I am not sure but that Kipling himself is the longed for Robbie Burns. Have you read his recent McAndrews's hymn —that hymn all a-quiver with the activities of two souls —that of a sturdy engineer and that of the mighty engine that drives his ship through the seas ? Wonder, pride, poetry, reverence, deep religious feeling,—they are all there in the man, in the machine, one hardly knows in which, so transfused they seem to be throughout them both. *In all parts* of the great obedient engine, the poet sees :—

" Interdependence absolute, foreseen, ordained, decreed,  
To work, ye'll note, at any tilt and every rate o' speed  
Fra' skylight-lift to furnace bars, backed, bolted, braced and  
stayed,

**And singing like the mornin' stars for joy that they are made."**

Nay, so skilful is the poet's touch, that for a moment, the handiwork of man, gloriously transfigured, seems greater than the man himself.

" No doot for the machine," he sings, " but what about  
the man?"

" The man that counts, wi' all his runs, one million miles of sea,  
Four times the space from earth to moon—  
**How far, O Lord, from Thee?"**

That, friends, is the final question in all educational discussions, what about the man? Processes begun, elements mastered, lessons learned,—no doubt about them all, but what about the man? We do not do our best by him in school until we plant in him the germs of great thoughts and cause his soul to be nobly stirred.

If the handiwork of the student does not rise above the commonplace while he is in school, it is to be devoutly hoped that his soul will. If art is long, (as Goethe says and Longfellow sings,) the beginnings at least of the artistic sense are reasonably short. Art creation belongs to the later life, or, more likely, it will never come at all, but the feeling for art—there is something lacking in any education that does not early aim for its quickening, its extension and its refinement, for it is the blossoming out of the higher nature.

#### DISCUSSION.

Remarks by Albert E. Winship, Editor *Journal of Education*:

Education is no longer acquisition, but attainment. The best of success and happiness is not what one has, but the use made of what one has. How much one can get and how little use is not the question, but rather how much use is made of what one gets. The ethical and æsthetic are now more vital than the economic; indeed, the economic is now largely ethical and æsthetic. He is rich and happy who can get the most satisfaction out of the least, who can make a little do a great deal of good. The æsthetic element will enable a young woman to add more to her attractiveness with an inex-

pensive bit of ribbon than another with an outfit of new garments. One flower may be made more effective in beautifying home or grounds than a whole bouquet or a garden.

Education in æsthetics has sometimes been misdirected to criticism, teaching one to be constantly uncomfortable because high art is so rare, while the æsthetic in education tends to make one group the common things of nature and life into garlands of beauty. Under the microscope the furziest leg of any wriggling thing is perfect, while the most perfect bit of polished steel is chaos ; so the æsthetic in education teaches one to see beauty in nature, to be comfortable in the presence of whatever is God-given. Poverty cannot make one poor who can enjoy nature in all its beauty ; wealth cannot make one rich who can find no beauty or comfort in the every-day conditions of life. It was the æsthetic at its height that prompted our most classic poet to write :

"I'd give more for one live bobolink  
Than for a square mile of larks in printer's ink."

The wealthy have beautiful paintings in their homes, and the public has access to high art in museum, art gallery and public library, but few live in the presence of art. It is as much the duty of the public to provide beauty through art for the children of the poor and the rich alike in their school life as it is to provide heat and sanitation ; it is as vital a matter to have the best taste inspired as to have the body warm, to have the sanitation of mind and morals cared for as the buildings in which children study.

Many cities and towns provide art in pictures and

statuary, all of which contributes not alone to the æsthetic taste, but to the best information and highest appreciation of geography, history and literature, a correlation so simple and useful as to win universal approval. The æsthetic element in youth or maiden contributes as much to success, comfort and culture as information in science, accuracy in mathematics, or correctness in language, and it is intellectually stimulating for one to learn how to do the correct thing artistically in home and society. The æsthetic element in education has been too long neglected, and it is devoutly to be hoped that we are to have an educational renaissance that will magnify æsthetic ideas, and that coming generations will know, enjoy and use the good and the beautiful in nature and human nature.

## VIII.

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### THE CLAIMS OF MODERN LIFE ON EDUCATION.

BY WILLIAM T. SEDGWICK, PH. D., PROFESSOR OF BIOLOGY,  
MASS. INSTITUTE OF TECHNOLOGY.

In the language of biology, the function of education is the higher adaptation of the organism to its environment. Its place as a factor in the great process of which it is one phase, is well defined in the familiar words,—birth, education and experience.

Nature herself, working through the race by the mysterious influences of heredity, and more directly by the processes which, taken together, we call ontogeny, shapes and moulds the plastic body, and provides those instinctive functions which enable the young organism to make its entry into the world as an independent being roughly adapted to its new environment. This portion of the great process of adaptation of the individual we describe in a summary fashion as *birth*.

At birth and long before it the new organism is slowly, but surely, fitted for the life it has to live. And so adequate is the preparation that the vast majority of the human species, and all below the human, are able to dispense with almost all further adaptation except that which comes from experience, and to go through life without any of that higher preparation which it is the

duty and the privilege of education to supply. But after birth there quickly comes a time when, besides the internal influences of heredity and development, a larger variety of external stimuli begin to play upon the child. The senses waken, and the nervous system, now become impressionable, quickens and thrills with incoming impulses; when, after having been hitherto mainly acted upon, reaction begins, and the new mechanism slowly and methodically built begins to do its appointed work as an individual: to be no longer chiefly ministered unto, but to minister. This is the transitional period, the period of *education*, midway between our birth and our experience.

Last of all, and highest of all, in the long process of adaptation to the environment, comes *experience*, which is supreme, because it is the outcome of intercourse between the individual and the world, alone, apart, and face to face, and because it is capable of yielding results which every man or woman may detect and profit by, results which in favorable cases may ripen into the highest product of all birth, all education and all experience, namely, wisdom or understanding, which shall lead to the discovery and mapping by the individual of his own powers and limitations, and the shaping of his course through life accordingly.

Of these three great factors of adaptation only two are indispensable and inevitable, viz., birth and experience. Formal education may be dispensed with, but birth and experience never. And we must frankly allow that so much of informal education may be, and often is, included in birth and experience, that some may get on fairly well without the more formal kind. There is

undoubtedly a process of natural education, such as Professor Huxley has referred to in his essay on a liberal education, and as compared with this all that teachers can supply must be accounted artificial. It is the adaptation wrought by nature and experience alone, which constitutes the basis of the success of the self-made man, if indeed his success is real; and such success may be due either to birth or to experience, or, probably more often, to both.

All honor to such men and women! If they have achieved genuine success, if they have indeed reached true adaptation to their environment, so that they are eminently useful and happy—for no less adaptation than this can be regarded as successful—they deserve all praise; for they have done it without that helping hand which the teacher, as an intellectual parent, would have stretched out to them; without any recognized share in that rich heritage of the ages to which more formal education might have entitled them, and without the glorious company of the intellectual apostles and martyrs, at least in their youth when it would have availed them most. It was Edmund Burke who exclaimed, "What is the education of a generality of the world? Reading a parcel of books? No! Restraint and discipline, examples of virtue and justice; these are what form the education of the world."

We have defined the function of formal education as the higher adaptation of the organism to its environment, and it is the duty of the educator to consider how this higher adaptation should be secured. The problem is at best difficult, for it is required by the terms of it that an unknown organism already moulded to an un-

known extent by nature or previous training, shall be made more highly adapted to an unknown environment. No teacher knows, or can know fully, the natural endowments of his pupil, or the precise environment for which he is to be fitted. And yet the case is not as desperate as it seems, for the reason that human beings have much in common, and experience proves that the environment of to-morrow will differ but little from that of to-day, though probably more from that of yesterday, and always more and more from previous environments as we recede into the past. It is, then, obviously our duty to adapt the organisms committed to our charge to the environment of to-day, because in so doing we prepare them as well as we can for that of to-morrow. Education is nothing more, and should be nothing less, than a higher preparation for life, and, as we have seen, the nearest representative of the environment we have to prepare for, is to be found in the life of to-day,—in contemporary life.

It is an old saying that the best prophet of the future is the past; but it would be much more true in these days of rapid change to say that the best prophet of the future is the present. It is no longer the past, with its academic shades, its quiet lives of contemplation, its local feeling, which is the best prophet of the future. Wonderful changes are upon us. The whole world is at our doors. Catastrophes and wars at the antipodes thrill us with sympathy or horror; any man may travel in a few days further than Ulysses did in all his wanderings. The sword or javelin is but a feeble prophet of the machine gun or the repeating rifle; the chariot, of the horseless carriage; the harp of David, of the

grand piano ; the gilded coach, of the Pullman car ; the speaking trumpet, of the long-distance telephone ; the signal beacon, of the telegraph ; the wheel chair, of the bicycle ; the dug out log, of the modern steamship.

No : the best prophet of to-morrow is to-day, and of the future the present, for to-morrow and all the future grows directly out of to-day, and only indirectly out of yesterday. "The ancients," said Roger Bacon, "have committed all the more errors just because they are the ancients, for in matters of learning the youngest are in reality the oldest. Modern generations ought to surpass their predecessors, because they inherit their labors." Three centuries later Francis Bacon made of the same fact his famous aphorism, "*Antiquitas seculi; juventus mundi.*" This point is so fundamental and so vital that I venture to repeat it: Education, in my judgment, is one phase of that preparation for life which biologists call adaptation to the environment. But the environment for which adaptation is required does not yet exist, although it is that of the near future, and the best we can do is to forecast it (if we dare), but in any event to prepare for it by carefully considering that which is the most like it and resembles it more closely than any that we know of, namely, that of to-day. Education, if it would adequately prepare for to-morrow, must in large measure be adapted to the life of to-day. It must adequately reflect that which is worthy and important in contemporary life.

Does it now do this? Are the characteristic and important features of modern life sufficiently recognized in education? For my part I do not think that they are or ever have been. It is the natural tendency of educa-

tion to be conservative, and this is right and proper; but education has too often lagged behind conservatism and relapsed into pedantry. A sound and wise conservatism is desirable and necessary, and in the past during periods of slow change great conservatism even, did little harm, because yesterday, to-day and to-morrow were almost identical. If any adaptation was secured even for the environment of yesterday, it served almost as well for that of the morrow. But in a time like the present, full of swift changes and with new and marvellous modes of life and thought following hard on the heels of incessant discovery, educators must look alive if they would have their profession fulfil its normal function of effecting the higher adaptation of the modern organism to its environment.

The biographer of an eminent Boston clergyman, lately deceased, refers to a failure of the teachers of his day to forecast the future and to recognize the claims of modern life on education, in the following passage: "Short courses of primary instruction fitted young Frothingham for such education as was then furnished at the Boston Latin school. This was no doubt good of its kind, but the kind was grimly classical. One precious year, as I remember, was devoted to memorizing the Latin grammar, and resulted in the fluent rattling off of long lists of exceptions to its incomprehensible rules. This accomplishment many of us, in after life, would have willingly exchanged for information bearing more directly upon the sad, post-classical period wherein our lots had been cast."\*

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\*J. P. Quincy on O. B. Frothingham. *Mass. Hist. Soc.*, March, 1896.

I may be wrong, but I cannot help believing that if the teachers of the Latin school in those days had taken pains to give their pupils information of some of the latest discoveries of Faraday and Liebig, and Lyell and Cuvier and the microscopists, information for which Mr. Frothingham's biographer says they would willingly have exchanged some of their Latin grammar, the present, which to him is a "sad, post-classical period", would not only have been less "sad," but full of fresh interest and new marvels. Let this indirect indictment of the teachers of that time be a warning to ourselves. It is so easy in education merely to drift; so easy to forget that we ought not only to keep alive what is good in the past, but also to prepare the way for what is before us.

It is a fact in embryology that in its earliest stages the embryo recapitulates and passes through in some measure the more important phases of the history of its race. But in this recapitulation much is omitted and all is abbreviated, while those features become finally most prominent which belong to the nearest ancestors. The chick, for example, passes in the egg, through a stage in which it suggests a fish; but that would be but a sorry specimen of a chicken which should step from the egg out into the world covered perhaps with feathers, but having fins instead of feet and gills instead of lungs. Similarly that youth who passes from school into the life of this post-classical period, furnished only, or mainly, with ancient lore, is an anachronism. Our fish-like bird would probably find his environment "sad," and so, in increasing measure, will the youth of to-day who is not adapted to the post-classical period in which his lot is sure to be cast. If we would avoid

anachronisms of this sort, we must be careful to see that modern life is duly represented in modern education. It was simply because it was too much ignored in the older institutions that such schools as the Rensselaer and Worcester and Rose Polytechnic Institutes, the Lawrence and Sheffield Scientific Schools, the Massachusetts and Stevens Institutes of Technology and Lehigh and Purdue Universities were established. It was found that the older colleges were living too much in and for the past. The present, full of progress, and the future, full of promise, knocked loudly, but in vain, at their doors. To-day, even, most of our colleges and universities, while quietly introducing something of the present, protest loudly in the main, their fealty to the past. It is because of a neglect of the claims of modern life in ordinary secondary education that schools of manual training are springing up ; it is because of these claims that preparatory schools in increasing numbers are sending their graduates directly into law schools and medical schools without preliminary collegiate training, and it is certain that law and medical schools will arise to meet the demand for such abbreviated courses.

The claims of modern life on education are constantly more and more imperious. It is hardly necessary to point out that within the present century the environment of civilized mankind has undergone a mighty change. The development of machinery has profoundly affected the ordinary conditions of life. Much that was formerly done by the muscles of man or other animals, is now done by machinery, with a vast gain in economy, speed, and efficiency. Machinery sows our fields and reaps the crops which it has sown ; it threshes, winnows

and grinds our grain, and the black bread of the past, wrung by man with difficulty from unwilling soil is gone, probably forever. The match has replaced the flint and tinder ; the steaming railway train, the coach with steaming horses ; the glowing coals of the earth, the less enduring fuel of the forest. I need not dwell upon these now familiar things ; but they and thousands like them go towards making up an environment to-day only less complex than that which will be to-morrow.

Again, man's attitude towards nature has within this century profoundly changed. Man is believed, by those most competent to judge, to be related to the lower animals. Some hint of this should be given in our modern schools as a basis of fact upon which to build : for action is as a rule based upon knowledge or belief. Much of the physiology and hygiene taught to-day is antiquated and discredited. Here is abundant room for change. Zoölogy and botany are too often taught much as they were forty years ago, in spite of the fact that a complete transformation has taken place in our knowledge of them. We need to teach facts but we need perhaps even more to teach general principles, and the broad generalizations of modern science. Obviously we must have language, and the art of numbers, and reading and writing, as of old ; for these are the foundations upon which everything must be built. But we must have also the rudiments of modern science.

My contention is that at present the scientific side of life is inadequately represented in the curriculum of education. I do not ask that it shall have exclusive possession ; only adequate representation, and in order to avoid mere generalities and vagueness I will be speci-

fic. In my judgment the conduct of modern life requires first and foremost that a knowledge of *Nature and the laws of nature* shall be accessible to all, and when capacity allows, required of all. And here, as elsewhere, a very little rightly chosen and well given goes very far. The modern "nature studies" if well done, embody, for the lowest grades, exactly what I mean, namely, a careful observation and study of things; of living things and lifeless things; of forces and motions and temperatures and processes; of weight and specific weight; of solids, fluids and gases; of birds and beasts and their habits; of stones and sands and soils and dust; of fibres and textiles and leather and glue; of nails and screws and lathes and edge tools; of water-pressure, and wind-pressure, and steam-pressure and tides; of simple machinery,—such as clocks and coffee-mills, and sewing-machines, and mowing-machines and water-wheels, with the sources of their power; of pumps of various kinds, and whistles and light-houses and simple enginery and boilers and batteries and dynamos. And then in the higher grades these subjects and others like them should be expounded, not necessarily individually but in respect to the *principles* underlying them. Matter and energy with their transformation and conservation are generalizations so far reaching, and unlocking so many modern doors, that they should be mastered by all who profess to be even fairly educated. In the lowest grades we need to teach facts and phenomena; above the lowest, reasons and principles; and still higher, laws and the more general principles. In the highest of all we need to learn how to discover new facts, new phenomena and new general principles, and also how to apply our learn-

ing and our discoveries for the benefit of mankind. If one is to be brought into harmony with, or adapted to, the environment of to-day in order to be prepared for that of to-morrow, he must study the things of to-day. Otherwise he will surely find this "post-classical period" a "sad" one.

And we need these things not merely for those who mean to live by them but also for those who must live with them. A recent writer,\* himself a professor of English Literature, has well observed: "Modern science has invaded modern life; its devices meet us at every turn, its great conceptions fill our minds. . . . Literature itself must largely find its raw material . . . within the domain of Natural Science, and this increasingly as the years go by.

"He who would adequately interpret modern literature should know modern life, and in that life science is a marked element. . . . Even the casual reader of Tennyson must have noted how deep is his interest in scientific study and how fully the great conceptions of modern science find expression in his poetry. . . . A man who is unacquainted with modern science can not well understand the language of educated men, and he can not interpret sympathetically and adequately the literature of his own day."

In all that I have said I must not be misunderstood. I have no desire to see the classics driven out or discredited; all I ask is that they shall take their proper place under the changed conditions of to-day, allowing to the just claims of modern life a fair share in educa-

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\*A. H. Tolman, *Pop. Sci. Monthly*, May 18, '96.

tion for the future. I have urged that education should be a reflection of what is most important and most worthy in modern life ; and perhaps the most important and most worthy elements of modern life we owe to Greece and Rome. I am more than ready to honor, with Professor Jebb, "the two-fold claim which entitles Greek to a permanent place in a liberal education : first, the claim arising from its intrinsic power to satisfy mental and moral wants which become more widely felt, the more widely liberal studies are diffused ; and, secondly, the historical claim, arising from the relation of Greece to the literature and the life of subsequent ages." No one who cares for learning and for humanity can refuse to go with Professor Jebb further, even, if it is true, as he claims, that "the highest office of the classics" is "to influence the character, to chasten judgment, to illuminate the understanding, and, in a word, to render their disciples more truly humane." No one knows better than I do that it is to the Greeks that we owe the beginnings of science and, what is far more important, the first cultivation of the scientific spirit.

It is more than a quarter of a century since the great Master of Trinity said, and said truly, "two of the great elements of a thorough intellectual culture, mathematics and jurisprudence, are an inheritance which we derive from ages long gone by, from two nations—from *the* two great nations, of antiquity. They are the results of ancient triumphs of man's spirit over the confusion and obscurity of the aspects of the external world ; and being true sciences they were well-fitted to become, as they became, and to continue, as they have hitherto continued, to be main elements in that discipline by which man is to raise himself above himself."

This is no less true to-day than then. But beside the old, and hand in hand with it, should stand the new: for these, also, are "true sciences," and not the mists and vapors of speculation or surmise. Mr. Frothingham's biographer did not so much complain of what he got in the Boston Latin school as of what he failed to get. And Carlyle somewhere voices what many have felt when he says: "For many years it has been one of my constant regrets that no schoolmaster of mine had a knowledge of natural history, so far, at least, as to have taught me the grasses that grow by the wayside, and the little winged and wingless neighbors that are continually meeting me, with a salutation which I cannot answer, as things are! Why didn't somebody teach me the constellations, too, and make me at home in the starry heavens, which are always overhead and which I don't half know to this day?" John Stuart Mill, as early as 1867, urged a more thorough use of the sciences in education, in a long and valuable paper, from which I can take only a fragment: "We are born into a world which we have not made; a world whose phenomena take place according to fixed laws, of which we do not bring any knowledge into the world with us. In such a world we are appointed to live, and in it all our work is to be done. Our whole working power depends on knowing the laws of the world—in other words, the properties of the things we have to work with, and to work among, and to work upon."

I have now said enough of the claims of modern life upon education; but I must repeat that in modern life is included not only much that is worthy in science —what Dr. Whewell distinguishes as true science,—and

in art and industry, but also much that is worthy in literature and the fine arts, in architecture, music and poetry. These, however, were characteristic of ancient life, as well, and so do not need special treatment in an attempt to consider the claims of *modern* life on education. What is peculiar in modern life is its mastery over the forces of nature and the ways of life and work ; and these, in my opinion, ought to have larger consideration than they now receive in education. Moreover, modern life is making other claims upon the education of to-day. For example, there is the physical or physiological claim, the claim of the hard-pressed body which brings to modern life a structure moulded by, and adapted to, the past. The very richness of modern life makes it somewhat indigestible. We must remember that the body needs rest as well as food : recreation as well as sport or exercise, sleep as well as stimuli. Again, in the turmoil of the times, we are not careful enough of those things which make not only for righteousness, but for the peace and joyousness of life. Altruism and ethics, poetry, philosophy, music, art and religion, for the expression and the satisfaction of the emotions, are even more necessary to man in his modern restlessness than they ever were before ; and after education has provided for the more imperious claims of practical modern life, it must face another problem which awaits solution, namely, how to make life simple in its complexity and joyous in its sobriety. He who solves this problem will probably have taught us not only how to overcome the sadness of the present "post-classical period," but also how to explain the historic melancholy of the Greeks.

## IX.

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### **THE MANUAL TRAINING HIGH SCHOOL IN ITS RELATION TO PREPARATION FOR COLLEGE.**

By Ira N. Hollis, Professor of Engineering in the Lawrence Scientific School of Harvard University.

At the request of your President, I have undertaken to say a few words on manual training as part of a preparation for colleges and scientific schools, and, at the outset, I find myself divided between the hope that it may prove an effective addition to our high school courses, and the fear that it may be allowed to drop back into the purely craft schools. It seems to me that its value will depend largely upon the ability of the teachers to make it supply a sufficient mental discipline. There is little doubt of its success in the trade schools, as there young men are prepared for certain definite trades, and are expected to acquire skill enough to earn a living with their hands. The question in the high school is rather how far the workshops and draughting rooms can be made to replace or supplement the classroom work in language and science. The first inclination of many accustomed to the older methods seems to be to condemn off-hand everything which partakes of the trade as not educational in the strict sense of the

word ; but a candid and unbiassed study of the results already accomplished by the manual training schools of our large cities is certain to modify their views. We must not expect too much in the early stages of a movement, and this which promises so much for the future, is still young. It is obvious that a subject which has been taught for fifteen years cannot compete with subjects which have been the common stock of our schools for fifteen centuries. Our experience has been too brief, and the teachers have not yet had time even to develop the best methods of placing the manual arts before the pupil. We cannot, therefore, assert that the lapse of a few decades may not give us reason for supplanting to some extent both Latin and Greek for what now seems entirely too mechanical to prove of any service.

The growth of manual training as an essential feature of our public school system will depend upon its acceptance as part of a preparation for college. No method of education will ever become popular with our people, if it can take only the children of poor parents and train them for certain special industrial pursuits. It makes no difference how worthy these pursuits may be, or how well the students may be fitted to follow them, the average American boy must have a future held out to him if he is to do his best work in the schools. Industrial life may well be compared with an army in which there must always be a possibility of promotion from the ranks to secure the highest fighting efficiency. If one school prepares men to become officers and commanders while another trains them only to carry a musket, the latter must suffer. An apt example

of precisely this condition now exists in the navy. The school at Annapolis educates officers, while the apprentice school at Newport trains enlisted men. As a result the latter is largely made up of boys who cannot be managed at home, or whose parents are too poor to support them even while young. The school serves a useful purpose no doubt, although the navy gets little benefit for its pains, as over ninety per cent. of the men leave to enter the merchant service where promotion is open to them. The manual training schools are likely to drift into a similar secondary position unless they are tied in some way to the higher education. The members will consist of young men out of joint with the ordinary high school courses, and of those whose parents must place them where they can get a little education and at the same time learn to make a living most quickly. This is not urged as an objection to manual training, but to point out the essential difference between the school which opens the way to advancement and that which does not. Young men are not equal in brain capacity, yet few like to be classified as unfit for advancement. The manual training school must therefore form a connecting link between the elementary school and the college, if it is to attain a permanent position in our educational system.

One may be led to think from the confident assertions of the manual training teachers that it has already attained that position, and that it is something more than a passing fad, but the real fact of the case is that the workshop has not yet had the opportunity to demonstrate its value; because, (1) its teachers are usually discredited; (2) the work of the student does not count

for admission to higher schools ; and (3) the students themselves do not usually possess as high a grade of intelligence to start with as we find in the English and Latin high schools. The last mentioned reason is often put forward when the graduates from these schools do not succeed well in college. It does not follow from the above that the workshop has no possibilities in the future.

The Mechanic Arts High School, in Boston, is founded on what seems to me the correct principle, that of forming a third road from the grammar school into the college. So far as the subjects taught are identical with those given in the English and Latin schools, there can be no doubt of equal efficiency. It is the distinctive feature of this school, the workshop, which is still in question. In estimating its probable value, we must take into consideration the great change in the views of education during the present century. We are still in the midst of rapid changes. Formerly education was limited to a study of Latin, Greek and Mathematics. The Bible and the classics occupied much the same position that Confucius holds among the Chinese to-day. Something of this still survives among those who can see only one road to a liberal education. The developments of science have forced our universities into scientific courses which may be pursued without the classics, but with more thorough training in mathematics, natural science and modern languages.

We have gradually come to look upon education in a different light and we no longer limit our ideal of a cultured man to one who knows Greek. No man is liberally educated who cannot enter into sympathetic relations with the great mass of our people. A man

who knows only business, like the teacher who knows only the classics, is not educated. While this one may have at his command vast statistics on the price of stocks and merchandise, the other may have encyclopedic knowledge of the ancients; yet neither may be fitted to deal wisely with the human element in affairs and education. Great acquisition in any one direction does not necessarily imply education, if we take the broad sense of the word. A man may be great in music or art, and yet be distinguished for his narrow-mindedness.

The industrial developments of this century and the changes in social life have introduced new forces which must be dealt with in the schools as well as outside. We must prepare our children for the twentieth century and the new life which must spring from the discoveries of this century. No man who has a share in the government of the vast army of workers should be ignorant of the processes of converting crude materials into shapes both useful and necessary to mankind. It seems to me so important that our business men should understand industrial problems that the question, whether manual training can become part of our school system or not, does not appeal to me. The real question is, how soon can it be made an effective part of our educational system? It seems a long way round in attaining the end reached by the study of language and history, but, perhaps, the ends should not be the same. We not only reckon the economic efficiency of a steam boiler by the amount and the quality of steel in it, but also by the repairs, the attendance and the coal subsequently required to make it of use. Any increase in the first cost, which reduces the running expenses, is likely to be an econom-

ical expenditure of money. May this not be true of education? May the addition of the workshop in the schools not become a great saving in the long run, not in a utilitarian sense, but in the real education of the mind? I once asked an old army officer what would give a young graduate from West Point success in his career. He said, "A good stomach." There is a strong element of sense in this reply, as more men fail in life from weak bodies than from lack of brains. Our schools are recognizing this fact more and more. It seems to me that there is an element in manual training as essential to success in life as we are likely to find in those studies which have heretofore been considered of supreme importance. It is not a question of replacing them, but of adding to them an efficient ally. The training on the athletic fields goes part way towards supplying this element, but it is not for the many, and it contains other elements of great danger to the cause of education.

As stated before, the best method of aiding the manual training schools is to make the drawing and workshop courses count for something in the admission to college. The way is not clear to do this at present, and it remains for the teachers aided by the colleges, to bring the work into some kind of unity all over the country in order that we may know what to expect from the graduate of any manual training school. It has been stated that one of the chief obstacles to the acceptance of the modern for the ancient languages is the uncertainty of the teachers in the secondary schools. The same thing applied to the teachers of English a few years ago. May we not hope that co-operation will de-

velop some method of combining hand and brain in the education of youth that will lead to surprising results? This body of teachers can do much to encourage and aid the teachers in the workshop by joining in the movement to secure for them hearty recognition.

All efforts which tend to strengthen the mental training obtained in the mechanic art schools will likewise tend to uniformity and the acceptance of the courses for admission to college. The requirements for college should always be in the view of the secondary school teachers. This does not mean that boys are to be crammed for examinations, but that their school work should prepare them to go on if they see fit. There are not two kinds of education, one which stops with the high school and one which goes on through the university. They are both the same in character, and the one should always grade into the other. The curve of life is a continuous one, and there are no such gaps as we have in a boy's schooling. Man moves from place to place by steps, but his body has a continuous motion, so that one step grades insensibly into the next without jar to the joints and muscles. Do not our classifications into grades and schools tend to destroy the continuity of education? They may be convenient, but each school will become stronger as part of a complete system. Even the professional schools are separated too far from the colleges. Any professional subject studied thoroughly and in all its bearings is educational, and any academic subject studied in preparation for the professional course is professional. A well-known doctor told me several weeks ago that in studying the eye he had found it necessary to learn the elements of analytic geometry and

calculus. It is true that professional studies may not provide what is known as culture, but it is equally true that they may supply great mental development and power.

There is no life more instructive in its lessons to the children of this mechanical age than that of James Watt. He began by learning a trade as a mathematical instrument maker, and spent many years at manual labor. Yet he died at an advanced age, a true philosopher. No man of his time was better informed or more broadly educated. He seems to have been not only the moving spirit of our times, but also our type of an educated man. While his hands labored, his thoughts and studies reached out into science, antiquities, medicine, metaphysics, modern languages and literature. As a contemporary has said: "Nor was it at all extraordinary to hear the great mechanician and engineer detailing and expounding for hours together the metaphysical theories of the German logicians, or criticising the measures or the matter of the German poetry." It is interesting to note that his last years were spent in devising a machine for making statuary. The step from machinery to art and the beautiful is not a long one. If such a man grew up through the workshop, can we say that through it the mind is dwarfed and tied to material things.

Its possibilities are not yet grasped, and will not be so long as we treat it as a competitor of the culture subjects, instead of a helper and friend. It seems to me to afford the stimulus of rest from the class room, and the occupation necessary to make all school work palatable. When I recall the unfeigned pleasure over the small

things I could make as a boy, I would go farther than the school and put a hand lathe and a tool box into every house where there is a boy.

One of the chief difficulties in the way of counting the workshop, in which is also included the draughting room, is to fix a value for it. It is unlike the class room work in the classics, languages and mathematics, and must be in addition to them, but there is no reason why it should not become an alternative on the science subjects. The examinations for entrance to any college can be divided into two groups, required and optional subjects, a certain number to be chosen from the latter. This has been done in some cases. Drawing and the workshop can then become optionals in the second group. At present, as stated above, it would be very troublesome to fix their exact weight or equivalence, but the same attention to them that Harvard and the secondary schools have given to experimental physics would soon solve that question.

With regard to engineering schools the case is different, as the courses may, to a certain extent, replace those given to students of engineering. Older boys accomplish more work in a given time in the advanced schools, and, perhaps, profit more, owing to their greater maturity of mind. It does not follow, however, that the workshop is not fit for younger boys. There are certain processes which are in closer touch with the engineering profession than others, and the division of instruction between the lower and higher schools is drawn along these lines. Carpentry, wood-turning, light forging and hand work on metals may well be taught to engineers in the secondary school, leaving pattern making, heavy

forging and machine tools to the scientific school. Much study of workshop practice, manufacturing and metals, and some designing must be given with the latter groups to render the subject of value in a professional sense. It would seem, therefore, that young men preparing for the engineering professions are in danger of being carried too far, and that they should really take less workshop in the secondary schools than those going into other branches, devoting the time thus gained to mathematics and languages. The objection to the workshop as narrowing applies mainly when it is followed to the exclusion of other things which supply more quickly a mental training.

The teaching of drawing should cover elementary projection and descriptive geometry with a large amount of freehand work. My own objection to the methods in manual training schools is that drawing and the workshop are not close enough in touch. Every article which is produced in the shop should have gone through the process of measuring and sketching from an actual model. The student should receive a model from which he must make his sketch freehand, putting on dimensions so that he may take his own drawing at once into the shop where the work is to be done. A subsequent comparison of the finished product with the model from which the drawing was made could not fail to be useful. The loss of time would not be great and the danger of getting into a mechanical rut would be avoided. If these sketches were kept in a note book with appropriate descriptions of the materials to be used, peculiarities of construction and the names of all parts, the courses might soon become indispensable additions to the book

courses, especially if there were careful attention to English and accuracy of description. The note book could also be used in connection with entrance to college as the experimental physics note books are now used.

There is no necessity of going into the controversy on the technical details of teaching manual training before this audience. Such matters can safely be left to the teachers themselves. The trade tendency must be carefully guarded against, and everything must be subordinated to the mental and physical growth of the pupil.

In studying this subject, I am led to hope that the workshop may have a power to influence mankind to the higher education and to bequeath to those who toil with the hands cultured and contented minds. The generalizations of the student of social or economic science can have little value, if he cannot find human experience in the commonest article of manufacture and unwritten volumes of human history in every machine. At this, the close of the great century of invention, we find the world divided into two camps, the laborer and the brain worker, with no sympathetic understanding of each other ; we find ourselves in the midst of industrial and social changes whose effects no man can foresee ; and we find our country face to face with problems more serious than any since the French Revolution. We pray for help that they may be solved more peacefully and more to the glory of our race.

Who, better than the school-master, can undertake the education of our young men and women in those broad principles of life and society upon which the healthy solution of these problems must depend? It is

our bounden duty, then, to bring to the service of our pupils every instrument which may serve as a lever to lift mankind. If I were asked to state those events which have marked the separation of the modern world from the ancient, I would name the coming of Christ, the invention of printing and the invention of the steam engine,—religion, culture and the conquest of matter. Can the tools which have served us in this conquest be made to yield up their share in the education of our youth? Is it not by means of them that we must reach the homes of countless millions who toil, and carry to them that leisure to enjoy the beautiful which should be the common heritage of humanity? If not, the forge fires have but cast into darker shadows those who serve them, and the mines have but supplied the fetters to bind the mechanic and the laborer more securely to the machine that the few may rise to the light. Christ worked at the carpenter's bench, to gain human experience and to touch the heart of man, and the hope of mankind lies now in that union of hand and brain which alone is capable of teaching us true philosophy.

## X.

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### **ABSTRACT OF ADDRESS ON METRIC SYSTEM.**

**By T. C. MENDENHALL, PH.D., LL.D., PRESIDENT OF  
WORCESTER POLYTECHNIC INSTITUTE.**

The reason for inviting your attention to the subject which I have selected for to-night is not that I believe the body of New England teachers here assembled needs special instruction relating to the necessity for improvement in our system of weights and measures ; I do not forget that one of the earliest efforts made to secure this improvement was made by the Legislature of the State of New Hampshire, in which this meeting is held, many years ago, and that this was followed by the passage of a similar resolution demanding the adoption of an improved system of weights and measures by the State of Connecticut, another representative Commonwealth of New England. I bring the subject to your attention rather that you may have, if possible, a renewed interest in it and that your sympathy and support may be enlisted in behalf of an active movement to secure the necessary legislation to bring about a reform which has for some time been underway.

You are probably aware of the fact that during the past year an earnest effort has been made in the Con-

gress of the United States to secure the passage of a law making the use of the Metric System of Weights and Measures obligatory upon the people of the country after the 31st of December of the year 1900, thus opening the Twentieth Century with this important advance. In determining the attitude of educators in various parts of the country toward this question, some interesting facts have been developed through replies to circular letters which were sent to the heads of the educational departments of all the States and Territories in the Union. These replies were put in my possession by the Hon. Chas. W. Stone, who has been so actively interested in pressing this reform, and I have studied them with no little interest. In a general way, the movement to which Mr. Stone and many others have given their earnest attention for the last year or two meets with the approval of the great majority of the State Superintendents and Commissioners of Public Schools. There are a few States, however, not more than four, if I remember correctly, in which these officers are decidedly against the proposed reform. The reasons for this position are, some of them, very curious, but I will not take time now to give them to you in detail. One, it is worth while to mention, is entirely founded on the very loyal and patriotic proposition that we ought not to be indebted to any foreign government or foreign people for anything, and that, therefore, it would be very wrong for us to borrow a system of weights and measures from France. It was a matter of regret to the friends of this reform that the public school teachers of the United States were not more generally supporting it with interest and enthusiasm. It is not believed that there is any sensible

objection to it on the part of the teachers of the country, who, certainly, above all others, should appreciate it and recognize the great advantage that it would be to them ; but, through a lack of interest, oftentimes based upon a lack of knowledge, the support of this large and influential body was not as strong and unanimous as could be desired. For this reason I have been glad to accept the invitation of your Committee to speak briefly to you to-night upon the subject of improvement in our systems of weights and measures, and I must begin by reminding you of a few facts relating to the history of our present system, which will be, I hope, of interest and value.

The Constitution of the United States authorizes Congress to establish a system of weights, measures and coinage. As everybody knows, Congress has long ago exercised its power in the establishment of a system of coinage, but up to the present time, or, at least, until very recently, in connection with a measure to which I shall later refer, Congress has failed to exercise the privileges which the Constitution gives it in the matter of establishing a system of weights and measures. I am, on the whole, inclined to believe that this is a blessing, rather than otherwise, as there is much probability that if Congress had acted upon this matter at almost any time during the past century, mistakes would have been made. The clumsy, unphilosophical and burdensome system of weights and measures which we now have in use and which we have inherited from Great Britain, was known to the founders of the Republic as something which very badly needed reformation. One of the first to recognize this was George Washington, who in his first message to Congress urged upon it the duty which at

some time or other it must perform of reconstructing the existing system. Washington's interest was shared by Jefferson, and, indeed, by almost all of the distinguished men of that time. Thomas Jefferson, especially, took an active and ardent interest in this subject. Doubtless the most scholarly and learned President who has ever occupied the presidential chair, Mr. Jefferson, more than all others, was competent for and inclined to the study of questions of this sort. While in Congress, the question of the survey of the public lands came before the Committee of which he was a member, and he there proposed the introduction of the decimal system in land measuring, beginning by making the townships areas of ten miles square, instead of five or six as has since been determined. But the most important contribution which he made was the proposition to reform the whole system of weights and measures by the introduction of a unit which should be determined, as he at that time thought possible and as also did many others, by reference to some natural phenomena, and founded upon this, which was a unit of length, units of mass and volume which should be related to it in a philosophical manner. Jefferson's proposition had almost every merit that could be suggested. It retained the foot as a derived unit, only changing its length a very little to adapt it to the decimal division of the primary unit, which he proposed should be the length of a pendulum consisting of a uniform rod which should make a single vibration in one second. On proposing this system with all of its derivatives to a Committee of Congress, he submitted, at the same time, a modification of the then customary system which differed but little from that which we have at the present time, re-

marking that the legislators might adopt that which they had the courage to take. It is unfortunate for the fame and reputation of Jefferson and also for this country that they had not then the courage to adopt his perfect and scientific scheme, as it would undoubtedly have given us the prestige of introducing to the world a system of weights and measures which would have essentially all of the advantages which the Metric System now possesses. No action was taken by Congress, however, and we have continued up to the present time in practically the same condition as that in which we were left by Jefferson. It may be worth while to mention that at a somewhat later period, namely, in 1828, Congress did adopt a standard of mass for the United States Mint, which standard, although very imperfect and one which modern metrologists would instantly reject, is still the standard by which the coinage of the United States is regulated. The very approximate uniformity in our system of weights and measures which now exists throughout the country is due to an Act of Congress passed in 1836, by which the Secretary of the Treasury was authorized to manufacture a complete set of all weights and measures adopted as standards by the Department, for the use of Custom Houses and for other purposes, to be delivered to the Governor of each State in the Union, for the use of the States respectively. The object of this was to encourage uniformity by the adoption of these copies of Department Standards as State Standards by the several State Governments. This course was followed, and thus it came about that we have practical uniformity throughout the country in reference to the yard, and in reference to the pound, and in reference to the bushel, the gallon and

other derived units. The next legislation of importance upon this subject was that of the year 1866, in which there was passed what is known as the Metric Law, making legal the use of the Metric System of Weights and Measures throughout the United States. As a part of this law, is a table giving the relations between the several units of the Metric System and the customary system, so that practically, as the Superintendent of Weights and Measures has since determined, the law of 1866 defined the yard and pound in terms of the metre and kilogramme ; thus it appears that at the present time the only standards of length and mass that are strictly legal throughout the whole Union are the Metric standards.

About twenty years ago there was organized the International Metric Union, afterwards known as the International Bureau of Weights and Measures, the object of which was the preparation of a new international standard metre and a new international standard kilogramme, copies of which should be distributed among the contributing governments. The metre and the kilogramme which had been accepted as standards up to that time were thus known as the Metre and Kilogramme of the French Archives, and were prepared in the latter part of the last century. While the most perfect standards in existence at the time of their preparation, and indeed, for many years afterwards, they were faulty in some particulars, and it was wisely determined to make the most accurate copies of them that was possible, but with such modifications as were possible that would secure the necessary betterment of the standards and to finally adopt the copies as the international standards. About six years ago the work of the prepar-

ation of the copies of the international standards was completed and two beautiful standard metres were received by the United States Government, and two beautiful standard kilogrammes were also received, from the International Bureau of Weights and Measures. The seals which had been placed on these standards were broken on the second of January, 1890, in the Cabinet Room of the Executive Mansion, by the President of the United States, in the presence of the Secretary of State, the Secretary of the Treasury and a number of invited guests. They were thus authoritatively adopted as the national prototype metre and kilogramme. Thus it appears that our highest standards of length and mass at the present time in the United States are these copies of the international metre and kilogramme, and by recent declaration of the Superintendent of Weights and Measures, approved by the Secretary of the Treasury, the final standard of length to which all reference must in the end be made, is the international prototype metre kept at the International Bureau of Weights and Measures in Paris, and the final standard of mass is the international kilogramme, to be found in the same place.

I have given you this somewhat imperfect sketch of legislation to show you how little has been done in the matter of improvement, or preservation, indeed, of our customary system of weights and measures, and how much has been done in the way of securing the adoption of the metric system. It only remains for those who understand the enormous advantages of this great reform to continue pressing it upon the people and their representatives in Congress to secure the final and complete

adoption of this system as obligatory throughout the whole country. I hardly think it is necessary for me to go into any extensive argument of the relative values of the metric system and that which is now generally in use. Every teacher, particularly, is aware of the difficulties and complications that abound in our present system of weights and measures. Few can answer, if, indeed, any one can satisfactorily, why a standard bushel should contain 2150 42-100 cubic inches; or why a gallon should contain 231 cubic inches; and why we should have in our system of units of length such ratios as three, 5 1-2, 16 1-2, 40, 5280, etc., etc. Indeed, it is safe to say that no one man at the present time thoroughly knows the English system of weights and measures, and I venture to say that no half-dozen of those who are before me, although I could hardly select a better informed group in this particular subject, would be able to answer all of the questions by which one might be confronted in relation to this subject. In the metric system we have the enormous advantage which is possessed by our money system over that of any other series of ratios. In money we have the single ratio 10 and its multiples, and in the metric system of weights and measures this is so of length, mass, volume, area, etc. To learn the metric system it is only necessary to learn a few simple relations of fundamental units, such as the relation of the unit of length to that of mass, and a few terms, after which the whole matter is very plain sailing. I am sure you all remember the statement made in reference to this by Adams in his very remarkable report upon the subject of weights and measures in the early part of this century. He then said that the adop-

tion of the metric system of weights and measures, and the exclusion by it of our customary system, would be a greater labor-saving device for mankind than was the invention and adoption of the steam engine ; and when we reflect for a moment upon the enormous power which steam has been and is, when directed by man, and the enormous changes that it has wrought in the civilization of the world, it compels us to wonder why we have so long delayed the adoption of a system which possesses such great advantages. Jefferson, also, as early as 1790, in his report as Secretary of State to the House of Representatives, said : "I propose to introduce every branch of the decimal ratio already established for coins, and thus bring the calculation of the principal affairs of life within the arithmetic of every man who can multiply and divide." No one, indeed, who has ever given this subject serious consideration has failed to appreciate the enormous advantages that would come to us in the adoption of this system. It has been estimated, and I think it is not at all exaggerated, that at least one year of the school life of every child would be saved by this reform ; and when we are pressed on every hand for the introduction of other subjects into the school curriculum, or for the more thorough instruction in those subjects which are already there, we ought not to consider lightly any proposition which would add one year to the school life of the average child.

I sincerely trust that when this matter shall again be brought to the attention of Congress, as it is tolerably certain to be at the next session, it will receive the earnest and enthusiastic support of the large body of New England teachers which is so well represented on this occasion.

## XI.

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### **NATURE STUDY AND SCIENCE.**

BY T. W. HARRIS, PH.D., SUPERINTENDENT OF SCHOOLS,  
KEENE, N. H.

It is a familiar fact that during the last hundred years the number and range of studies pursued in our common schools has been steadily increasing.

This increase in the school course of study involves a serious tax upon the time and strength of both teacher and pupil. The improvement of our methods of teaching has made it possible so to economize both time and energy that the labor and the time required for mastering many subjects have been much lessened, and in this way opportunity has been gained for the admission of history, languages, manual training, and many other subjects of recent introduction. In spite of all this, however, the demands made on behalf of new studies are so great that it becomes necessary, when such a subject is offered for introduction into the school curriculum, to weigh its merits in comparison with those of other studies, so as to ascertain its relative value, and to determine whether the new study be of sufficient usefulness and importance, in order that it may be given a place in the already well-filled curriculum.

This weighing of the merits of a new study we find to

consist in the challenge of two questions, which the proposed study must meet and satisfy before we can claim for it the right to an acknowledged place in the school course. These questions are: (1) What is its educational use? (2) Can it be so taught as to realize this use effectively?

If the new subject of study can be shown to be educationally useful, and if the proper method of teaching it can be shown to be practicable, in view of the teaching resources of the schools, which may be immediately concerned, it will find its rightful place in due course.

One of the subjects which for a number of years past has thus been demanding recognition is the study of the objects and phenomena of nature. In many places, and in various degrees, this study has already received such recognition; but as yet it is by no means universally accepted. It may be fairly demanded, therefore, that nature study should be subjected, like other new studies, to the test of the two questions already propounded: and the aim of the present paper is to give to those questions, on behalf of the new study, an explicit and satisfactory answer.

The first question is—What is its educational use? I use the phrase *educational use*, rather than the more customary expression, *educational value*, because the term *value* as we commonly use it, implies the idea of some quantitative standard, or measure, like dollars, or shillings, which is entirely foreign to our present thought. Educational "value" is qualitative, not quantitative; it asks, not *how much*, but *of what sort*, is the *use* which the study in question performs for the pupil's educational needs.

Now the purpose of all education is the development of the pupil's personality in such wise as will adjust him the most perfectly to his environment; or which will enable him, in other words, to perform the greatest possible amount of effective work for the world in which he lives, and to receive the greatest possible amount of good from it in return.

The environment of this world, to which the pupil is to be adjusted by education, consists of two great fields —first, that comprising the objects and activities of nature; and second, that comprising the influences and activities of humanity. Considered in themselves the former is primary, the latter secondary; the former is the foundation, the latter a superstructure, formed and moulded in its quality by the varying influences of nature, yet often modifying nature more or less in its turn.

But considered in their relation to the pupil's educational development, the activities and influences of humanity are of primary, and the activities and influences of nature are of secondary importance. Humanity is of chief importance to the pupil, because he is himself a part of humanity, and its relations and influences are of the nearest concern to him. Yet his studies of humanity—its language, its history, its political geography, its social and economic aspects—can not be properly comprehended without an intelligent appreciation of the influences through which it has been moulded by the activities of nature. Even in literature, that study which as it opens to us so clearly the workings of the human mind, is perhaps the most thoroughly human of all, a knowledge of nature is essential; for to explain and make luminous to the mind the contents of the literary master-

pieces which are now being studied in our schools, the pupil must have some knowledge of the facts and relationships of the world of nature. What appreciation can a pupil, who has been brought up in the heart of a great city, with no contact with, or study of nature, have of "Snow-Bound" or "Hiawatha" or the essays of Burroughs, or Hawthorne's setting of the old Greek tales? Let one who is about to visit the Alps for the first time, read Ruskin's "King of the Golden River," and then let him read it again on his return; the mountains, and the glaciers, and all the natural scenery, will make the tale a hundred fold more vivid and delightful to his mind, because he has seen for himself the natural environment of the story, and it has become real to him.

The educational use of the study of nature, is therefore to bring the pupil into intelligent relations with the non-human portion of his environment, a field which, though less vital in its immediate importance to himself than the human field, to which the greater share of the attention of his school life is usually directed, is vastly greater in its extent, and of inestimable importance through its indirect bearing upon his human relationships. The educational use of the study of nature, is, furthermore, to enable the pupil, through his contact with the world of nature, so to adjust himself to that world, both as regards its immediate relations to himself, and as regards its influence upon his human relationships, as to attain by this adjustment a greater fitness for his appointed place and work in the world.

Such is the educational use of the study of nature. It now remains to ask—How shall the study of nature be so conducted that it may adequately fulfil its appropriate educational use?

The answer to this question is less evident. Methods, in nature study, are far from possessing the definiteness and clearness which characterize methods in arithmetic or reading, whose place in the school course has been longer established.

Before answering this question, therefore, let us look at the course of development of a few of these older studies, as they have made their way in turn into the school curriculum.

As was said at the beginning, the range and variety of subjects taught in our common schools has greatly increased since their first establishment in this country. If we inquire what the curriculum of the common schools of early colonial times consisted in, we find in the famous ordinance of 1647 of the General Court of the colony of Massachusetts Bay, the provision that "every Township of fifty householders shall forthwith appoint one within their towne to teach all such children as shall resort to him, to write and read." And it was further provided, that, "when any towne shall increase to the number of 100 families or householders, they shall set up a grammar school, the master thereof being able to instruct youth so far as they may be fitted for the University." That is (remembering that the condition of entrance to "the University," as Harvard college was thus for the first time called, was at that time the ability to speak and write Latin, and to know something of Greek grammar), these so-called "grammar schools" were schools for the teaching of Latin grammar, or classical feeders to the college whose curriculum shows it to have served at that time chiefly as a training school for the Christian ministry.

Hence the sole aim of the school of those early days was to teach its pupils to read and write—first English, afterward, if their education progressed so far, Latin and Greek. The “three R’s,” a phrase which to us is synonymous with the most elementary type of school instruction, was then actually a stage more advanced than the common schools of that day; for arithmetic, which has since become the backbone of our modern grammar school course, was then studied in but very few schools, and in those only in the most rudimentary way.

Reading and writing: that was all. Yet even then the school curriculum was full: for a slow and painful process it was then to learn to read and write by the old-fashioned alphabetic method, or rather lack of method, which prevailed in those days.

Yet even this was a mighty advance over the educational conditions of the middle ages. A thousand years ago no one thought of teaching children to read and write. Few indeed of their elders could boast of such an accomplishment. From the sixth to the eighth century, it is said, learning was at such a low ebb, even among the clergy, that an eminent French bishop, writing to the pope, lamented over the number of priests in his diocese who could neither read nor write, and asserted that there were even monasteries whose entire company of monks, abbots and all, were enshrouded in the same state of intellectual darkness.

In the beginning, therefore, reading and writing were accomplishments of the learned. The palace schools of Charlemagne, in which his courtiers were taught to read, were institutions for the instruction of youths and

men, and not for little children. At a later day the great public schools of England were founded for boys of tenderer years: but not until the time of the Reformation was any systematic attempt made for the instruction of little children; and not until the ordinance of 1647 was it publicly recognized that the art of reading and writing ought to be taught to all children.

Tracing this branch of study on down to our own day, we know how the old crude alphabetic and syllabic methods of teaching reading have given place to the less laborious and more scientific word and phonic methods: how the Testament, once the only reading book for all grades, has given place to the many series of readers, graded with the utmost care, and to the present wealth of supplementary reading for all stages and phases of school life: and how the art of reading, once the chief study of the school course, is now so quickly mastered that after the first few years the pupil, instead of learning to read, reads to learn, and by the skilful use of this educational instrument is able to gain access, while yet in his early school days, to all manner of higher learning.

Let us now turn from reading to one or two of the other branches studied in our schools. In 1789, more than one hundred and forty years after the Ordinance of 1647, the General Court of Massachusetts passed an act requiring every town to maintain a school for the term of six months, in which should be taught orthography, reading, writing, English grammar, geography, and decent behavior. In these hundred and forty years the course of study prescribed by state authority had become, as is evident, considerably enlarged. Orthography, or

spelling, had appeared, as an adjunct to reading and writing : English grammar had appeared : and geography and good behavior had been invented—as subjects for educational recognition. Yet, curiously enough, we find in this act no mention whatever of arithmetic. In fact, if I am correctly informed, it is only since 1862 that the teaching of arithmetic has been required by state law in Massachusetts. Practically, of course, we know that it made its way into the schools long before this : though, as was said above, in early colonial times, arithmetic was a study pursued in but few schools, and in these merely consisted in learning to count, and to perform the fundamental operations upon whole numbers.

By the middle of the eighteenth century it had attained an acknowledged, though not universal place, among the studies in our New England public schools. But it was then very rudimentary in its scope. Few pupils passed beyond the four simple processes, and those who mastered fractions or juggled with the "rule of three," were accounted skilled mathematicians. Yet in our schools of the present day the pupils are all expected to master not only these processes, but the unheard of mysteries of decimals, percentage, square root, and many other deep intricacies of the science, before they reach the end of the elementary school course.

That which has made this advance in arithmetical education possible, has been the better, more thorough and more detailed teaching of the subject.

Let us take one more example—Geography. In the early years of the Christian era this subject, like arithmetic, was esoteric : a science cultivated for its own sake by a few ardent admirers, like Pliny and Strabo, but

standing in no relation whatever to education. It was not until the journeys of Marco Polo and Columbus had aroused the crowned heads of Europe to a sense of the riches and the glory that might be gained through geographical exploration, that great public interest was aroused in the subject; and not until long after their time, that geography won for itself an established place in the school curriculum. How was it taught? At first geography, as taught in the schools, was merely statistical, with lists of cities and countries, and brief accounts of a few of the great natural curiosities of the globe; in short, of such stuff as sailors' yarns are made of. Then the subject became descriptive. In the geographical text-books, with which we are all familiar, each quarter of the globe is taken up in turn and described. Of course our pupils forget their geography when they learn it in this way, and are taught nothing of the marvellous relations which knit together these facts of geography. But already a new geography, a scientific method of teaching geography, is growing up in our midst, and illuminating the study by adapting it, through careful grading, to the pupils' unfolding capacities, and making clear to the child's ever questioning mind the reasons for the facts of the earth's aspect as he learns them. When our pupils all learn from their geography lessons how their own lives are knit into the world's life, we shall not find that their lessons go in at one ear and out at the other, and have to be many times relearned.

Thus we see that these three great subjects of study—Reading, Arithmetic and Geography—have made their way into the school curriculum by a process, as it were, of downward percolation. Beginning with those indi-

vidual, isolated students, who have cultivated them from a pure love of the studies themselves, they have been introduced successively into the fields of higher, secondary, and finally of elementary education.

And just as it has been with these three older branches of learning, so it is now with science.

It was introduced into the universities and colleges. Many of us can remember when the secondary schools made no attempt to teach science. Others among us can remember when it was introduced into those schools in an apologetic way, and when physics or zoölogy was doled out to us once a week or so, from a text-book. Of laboratory work in any branch of science we had absolutely none.

A few years later, Harvard University so modified its admission requirements as to demand laboratory work in physics as a preferred subject of qualification for admission. The secondary schools groaned, but nevertheless obeyed the summons, and prepared to administer to their pupils the dose of practical science prescribed by the higher authority. Finding it, however, less formidable than they had anticipated, they soon began to enlarge their scientific equipment of their own accord; until to-day there is hardly a secondary school of any standing, at least in New England, which does not furnish some facilities for scientific laboratory work on the part of its students.

And now we are preparing to push this science teaching even lower down in the course, and to teach elementary physics, and even chemistry in the higher grammar grades.

In the meantime, however, the teachers in the gram-

mar and primary grades have not been waiting to have the study of nature thus forced upon them. They have begun to ask—Has not the world of nature something of value for the youngest as well as for the oldest pupils in our schools? And they have been trying to find the practical answer to this question in the results of experiments which they have been making in the study of nature with their pupils in the schools. In making these experiments, they have been laboring under great difficulties. Very few teachers have as yet a thorough scientific acquaintance with the subjects which they are thus attempting to teach. There has been no systematic plan of instruction: hence the teaching has been fragmentary and aimless. The methods employed have not generally been such as would produce the most effective results upon the minds of the pupils. The old-style "object-lessons," once quite the fashion in schools, and familiar to many teachers, have been made to serve as the model for the nature lessons. When the study of nature came to be introduced into some such schools, it very naturally followed these lines, and so the fashion was set—and followed. The only difference was, that under the head of nature study, natural, instead of manufactured objects, were studied, and the pupils more often had the objects in their hands while the teacher talked about them.

Yet even in these crude attempts we can see how nature-study has been following the same lines of development as the older subjects of instruction. Already many teachers are beginning to see the imperfection in the study of nature as usually pursued, and to ask how they can make the study more useful; and in some of

the nature readers which have lately been issued for school use, some efforts toward a proper system in this work are discernible.

The study of nature is therefore at present making its way into our school courses in two ways: from above, as geography and arithmetic and many other subjects have made their way in; and from below, as a result of the conviction which has come to the minds of teachers, that the study of nature is a study suitable for the youngest as well as for the oldest pupils, and the consequent effort of those teachers to realize this conviction, without waiting for this study, in the slow process of percolation which is carrying it inevitably downward, to reach the lowest grades in the normal way. The two classes of teachers, therefore, though working for the same end, are working apart. Nature-study does not, as at present conducted, lead up to science, nor is science the natural and appropriate outgrowth and consummation of the study of nature in the earlier grades.

There are, however, many teachers who claim that there is a fundamental and essential difference between the attitude of the mind with which the child should approach nature in the lower grades, and that with which he should study science in the higher. Hence, say they, we must lose no opportunity of calling to the child's attention these aspects of nature, and as an aid in this, of bringing the child into contact with the wealth of literature which nature has inspired in the pens of many of our writers, both of prose and poetry, so that the child's feelings may be stimulated, and his perceptions awakened to the beauty and the harmony of the world of nature. The analytic methods of science teaching,

say they, which are proper to the high school, do not lead to this end, and hence are entirely unsuitable for use with little children.

Now while I recognize fully the importance of the education of the tastes and feelings: while I claim that the culture of high standards and ideals is of equal moment in all the three mental realms, in thought, in feeling, and in activity: I feel bound to express my total and emphatic disapproval of this attempt to fix a great and artificial gulf between nature-study and science.

The law of the State of Massachusetts provides that the schools in that commonwealth shall teach, among other things, good behavior: but one may walk from Cape Cod to the Taconics without finding a school where good behavior is taught either by didactic instruction or by text-books. The futility of such means of teaching right conduct is clearly recognized by every teacher.

The effective way to teach morals to the pupils in our schools is not by didactic lectures or text-book recitations, but by the contagion of a healthful moral sentiment among the scholars, and by the silent example and influence of the teacher's own noble life and character.

And in precisely the same way must we train the tastes and the feelings of our pupils. You can not teach a pupil the beauty and the harmony of nature by pointing them out to him. To understand them and to profit by them, he must find them for himself. Let him, if you like, read the essays and the poems in which Whittier, and Bryant, and Burroughs, and Emerson, and Burns, and Wordsworth, and a hundred others, have described the beauties of nature. All that is excellent,

but it is literature, and not nature study. It is not the study of nature at all, but of the thoughts which nature has inspired in the minds of those writers. The beauty and the harmony of nature are subjective, not objective qualities. You cannot teach them: but teach the child the marvellous scientific truths of the objects and facts and phenomena of nature, and their wonderful relationships one to another. Teach him to see how part adapts itself to part, and structure to need, and life to circumstance, in the organic mechanism of plant and animal—teach him to see how the life of the plant is adjusted to soil, and climate, and its other organic neighbors, and the life of the animal to all the conditions of its environments—and you can no more keep the beauty and the harmony of nature out of his mind, than you can shut the warmth of the sunbeams out of the window which you throw open to admit their light.

But some say:—These relationships are too complicated. Science can not be taught to very young children, such as those in the primary schools. They can not understand it.

Now this is emphatically not true. They can understand it, if the lessons are made simple enough, the steps short enough, and the language plain enough. All that is necessary to make these subjects luminous to the youngest pupils is to begin with what is familiar, and then to grade the work very minutely.

In the study of nature the facts and relationships which are to be taught should be carefully arranged in a graded series. The youngest pupils should begin with the simplest of these, and attempt but one step at a time; and from that pass on to the next, and then to

the next, each step following logically and rationally after the one next preceding, so that all together will form a consecutive, connected system; and we shall find that our work is no longer the aimless, hap-hazard nature-study of our own day, but true science.

What, then, we may ask, is needed on the part of our teachers to develop the study of nature to the degree to which the study of reading, the study of arithmetic, and the study of geography, have already been developed, and thus to transform nature-study to science in our schools?

First, and most important, our teachers need a better education in the sciences than most of them have as yet received: in physics and chemistry, which are the foundation of all the other sciences: in geography, geology, and meteorology, the sciences of inorganic nature: in zoölogy and botany, the sciences of the organic world: and in astronomy, the science of the universe.

Secondly, we need a better understanding of the child's own mental attitude toward nature, that we may be able the better to adapt our teaching to his mental state and capacity. To gain this our teachers need to devote careful attention to the study of the child's interests, as manifested toward nature, and the language in which he expresses his thoughts upon such subjects, so as to see what aspects and phases of nature appeal to his attention: which of these appear commonplace to him and which interesting: which reasonable, which mysterious, and which inexplicable: and to discover, if possible, the ground of the interest which he manifests. Teachers need also to cultivate the habit of looking backward through the years of their own experience, and trying to

recall their own childish impressions, and remember how the world looked to their own childish eyes. Nothing can give a teacher greater insight into the child's mental attitudes and mental needs than the power to do this successfully.

Thirdly, we need a more thorough and accurate knowledge of the process of development of the child's mind ; that the order in which we introduce him to the facts and relationships of nature may be to him the natural order, and that his study of them may lead him upward, without break, easily and naturally, from the lower to the higher aspects of the world of force and matter.

Finally, we need a course of study, elaborated on the basis of these requirements, and in accordance with the principles of educational philosophy : one which shall suggest a range of material for teaching (and we should see to it that we attempt no science teaching without having the materials in the pupils' hands, or at least under their observation, for them to study) : one which shall show us how to teach the more familiar first, and to pass thence to those things which are related, though more remote and less familiar : one which shall teach the concrete and particular first, passing thence to the general, and finally to the abstract : one in which the pupil's first observations are upon things of a moderate scale of magnitude, and afterwards upon things vast and upon things minute : one in which the pupil's first observations shall be such as may be quickly made, and complete, each in itself, but leading up afterwards to repeated observations, to observations in series, to continuous records of study, and to sustained investigation : and most im-

portant of all, one in which the work shall be minutely graded with reference to the pupil's capacity. By this I do not mean classified by topics, as botany or physics: the child's mental development does not demand such classification, at least in its earlier stages: but there must be a reason for every lesson; a reason why that lesson, and no other, follows next after the last lesson: a reason which explains why the particular bit of knowledge or experience to be derived from that lesson is the next step in the continuous growth of that phase of the child's unfolding mind.

The necessary limits of this paper make it impossible for us here to suggest any elaboration of such a scheme: nor would it be desirable, in a general discussion like the present, to do so, for in the study of nature, local conditions, and opportunities for the obtaining of materials, and resources for study, must exercise a determining force which they do not possess in any other study of the school curriculum.

Many tentative outlines for such a scheme of instruction, like the Bridgewater course, and others which might be named, have been devised: and superintendents and teachers would do well to consult such in arranging the several plans which are to be adapted to their several needs and resources. These are, however, at best, but suggestive outlines or skeletons, which await, so far as they are suitable for the purpose, the adaptation and addition of details which are necessary to fit them locally for practical usefulness.

Let superintendents and teachers therefore work out their own courses in science with the utmost regard to consecutiveness of thought and finish of detail. It is

not necessary that they should be alike. Their purpose will be served if they cultivate in the pupil an interest in and attention to the world about him, a spirit of self-reliance in observation, and of critical judgment in interpreting the phenomena of that world, an understanding of its marvellous truths, an appreciation of its essential unity, and of himself as a little part of it with a purpose to serve it its great economy. And as all roads led to Rome in the olden time, so can we hope that all methods which may thus be locally devised for the scientific study of the world of nature, each adapted to its local conditions, as are the plants and animals of the world to their several surroundings, may lead to the universal recognition of science as a necessary part of every school course, equal in importance to reading, or arithmetic, or geography, or any other study ; and to the practical accordance to it of that place in the school program and those facilities in the school equipment, which its importance as a means for the development of an essential part of the child's life unquestionably deserves.